NOVEMBER 1953

The Paper Industry

STABILIZED *Sodium Aluminate*

100% Soluble

100% Stable • 100% Available

NALCO 680 is *completely* soluble, *completely* stable... the one sodium aluminate that remains in solution as sodium aluminate and does not settle out.

Every ounce of Nalco 680 provides active alkaline alumina... always available for rapid reaction. That means reduced alum requirements, lower acidity, better sizing, better retention, and therefore, better products.

Read the results reported at right—then ask a Nalco Representative to show you how Nalco 680 can repeat them in your mill.

BOX BOARD MILL—Power Savings

"Machine tenders report much better sheet formation with Nalco 680, and that jordans can be cut back 10 amps. Machines are cleaner with no deposits on cylinders."

KRAFT MILL—Alumina Retention

"Improvement in sizing, better retention of alumina, and general texture of the sheet using Nalco 680 are very marked. Converter reports the sheet handles better."

SULFITE BOND MILL—45% Less Alum

"Results using Nalco 680 at the rate of five pounds per ton have been good. Improved sizing and reduced alum from 250 to 140 pounds per 4500 pounds of furnish. This enabled the mill to meet rigid pH specifications for the paper."

TISSUE MILL—Clean Machines

"No. 6 paper machine remaining clean and generally good results through the use of Nalco 680 applied at the rate of four pounds per ton."

NATIONAL ALUMINATE CORPORATION

6232 W. 66th Place • Chicago 38, Illinois

Canadian inquiries should be addressed to Alchem Limited, Burlington, Ontario

Nalco

. . . Serving the Paper Industry through Practical Applied Science

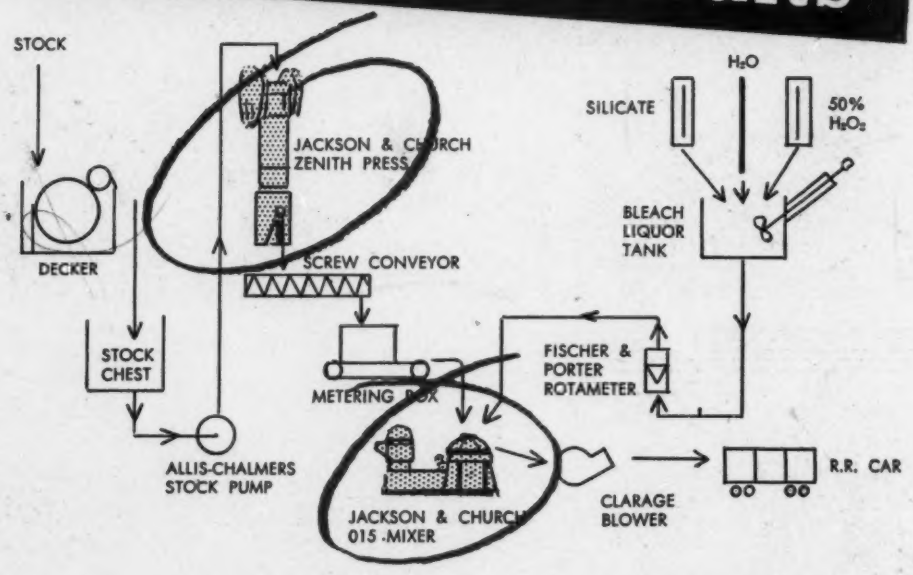
Groundwood Pulp

FIRM: Hoberg Paper Mills, Little Rapids Division

LOCATION: West DePere, Wisconsin

Plant, recently purchased by Hoberg, engages in groundwood pulp bleaching. Efficiency of bleaching operations increased through High Density Bleaching System using J-C Pulp Press and J-C Bleach Mixer. Results successful. Plant now handling 30 tons/day.

formula for results



The experiences of an ever increasing number of pulp mills proves conclusively that the efficiency of bleaching groundwood pulp can be greatly increased.

The Jackson & Church High Density Bleaching System makes possible *the same brightness at lower cost or greater brightness at same cost!*

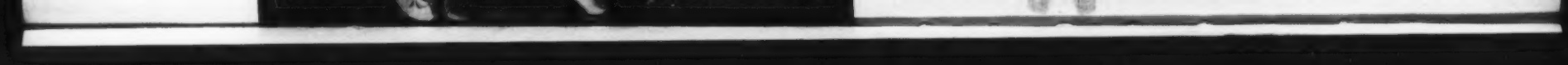
The market for bleached groundwood pulp is waiting. Let our engineers help you *sell* that market.

J-C Engineers are available for consultation and assistance in developmental work. For application to individual problems, write Dept. P.I.

J-C

JACKSON & CHURCH CO. SAGINAW, MICHIGAN

Work well done since eighty-one

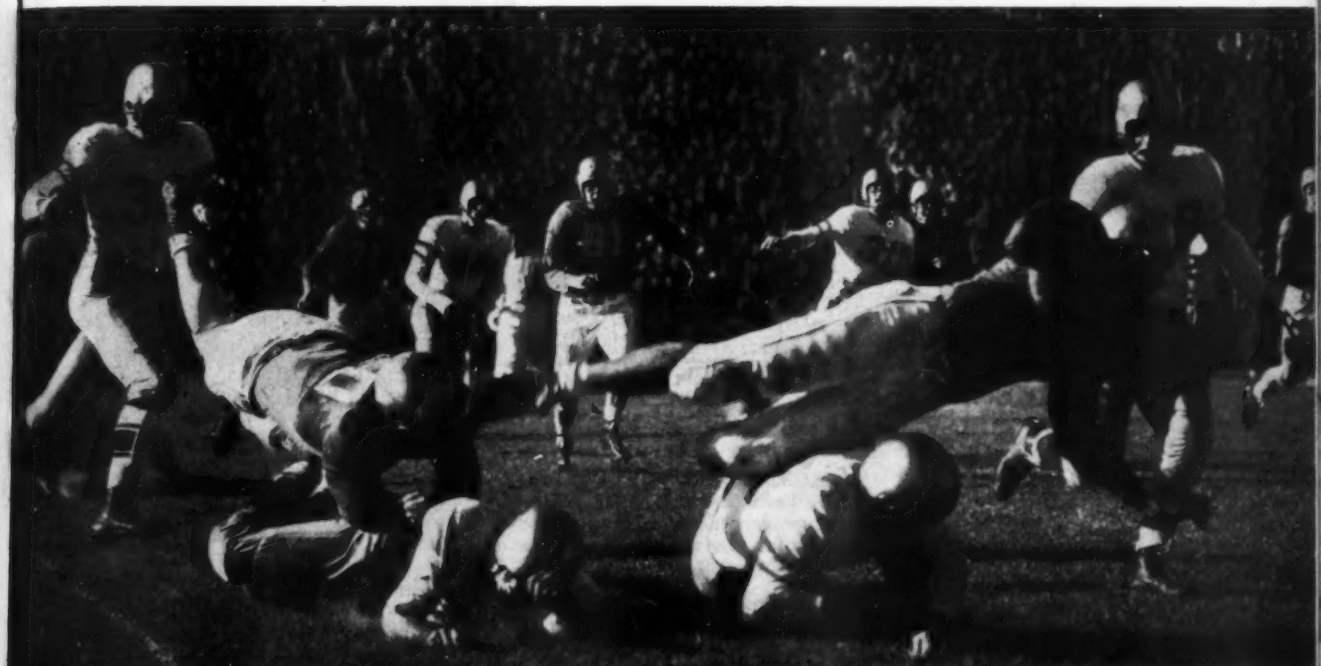


STAR PERFORMERS

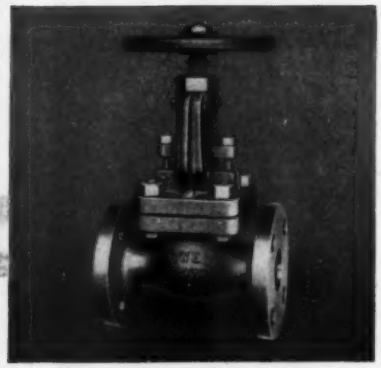
From coast to coast, Powell Valves have won enthusiastic approval. For *every* Powell Valve is a *star for outstanding performance*. They have a record of dependability since 1846.

Small wonder that Powell Valves have made such a hit through the years. Powell has probably done more valve research, solved more valve problems and makes more types of valves than any other organization in the world.

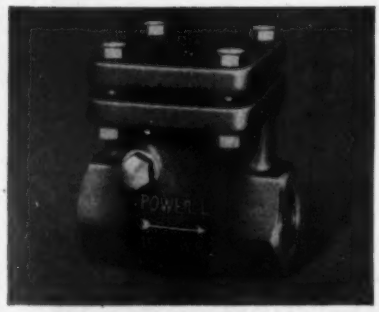
We're sure that *you* will be enthusiastic about Powell Valves too once you see how they perform. Following are just a few members of the Powell all-star cast of valves which are available through distributors in principal cities. If a distributor is not located near you, just write us. We'll be pleased to tell you more about these valves—and our complete line.



STAR ATTRACTION. Be sure to visit the Powell Valves booth, *Number 26*, at the 24th Exposition of Chemical Industries, November 30th to December 5th, in Philadelphia at Commercial Museum and Convention Hall.



ALUMINUM O.S. & Y. GLOBE VALVE *(Fig. 2445)* for 100 pounds W.P. at 350 F. Stainless steel (18-8) stem, composition disc, integral seat. Stem rises through bronze bushing in upper yoke. Sizes ¼" to 3", inclusive.



SWING CHECK VALVE *(Fig. 2341)* for 150 pounds W.P. Sturdily built for severe service. Bolted flanged cap. Disc is hung on 5° angle to permit full unobstructed flow. Sizes ¼" to 3", inclusive.

FLUSH BOTTOM TANK VALVE *(Fig. 2310)* for 150 pounds W.P. Designed for convenient and fast draining. Disc opens into valve. Also available with disc opening into tank (Fig. 2309).

STAINLESS STEEL O.S. & Y. GATE VALVE *(Fig. 2453)* for 150 pounds W.P. at 500 F. Interchangeable solid or double wedges are precision-fitted and accurately guided throughout entire travel. Sizes 5" to 30", inclusive.

P V

Call your G&K Distributor for *better* Power Transmission

Your Graton and Knight Distributor offers complete service and is ready to answer your requirements for:

More Production-Power with G&K leather belting engineered to fit your needs.

Easier Maintenance with top quality G&K lacing, cements and belt dressings that keep your belts pulling for you.

Help in Solving Belting Problems: Distributors' representatives and G&K engineers are at your service to help you get *more production-power.*

Say G&K for Flat Leather Belting

G&K Flat Leather Belting is tension cemented by a patented process, waterproof-treated and mildew-proofed. There's a brand for every service.

Heart Oak—top grade center stock oak tannage for lateral firmness and real pulling power. Famous general purpose belting . . . ideal for heavy duty, step-cone and shifter drives.

Research® — special tanning and currying insure highest coefficient of friction, great flexibility and resilience with minimum permanent stretch. Ideal for short center and serpentine *precision* drives.

Spartan® — special quality combination tannage and currying. Top pulling power with great flexibility and minimum stretch. Resists steam, oil, acid and alkali fumes.

Special Leather Belting

Spar-Oak, Chrome and Chrome Oak leather belting are processed to deliver more production-power under special conditions. All are mildew-proofed and can be waterproof treated.

Lace Leather

Three famous brands — Indian Tanned, Royal Worcester® and Black Chrome. Each provides the greatest strength and longest life under those operating conditions for which it is recommended.

Round Leather Belting

Whatever your application there is a G&K round leather belt made for the job. Acorn®, Hairound®, Velvitan, Patent Built-up and Folded Twist are dependable for long life and steady performance.

Leather V Belting

Adjustable link construction belting is available in single or double V for no-stretch performance on straight or serpentine drives. Spartan® Block V, Solid V and Laminated V are all easily made endless.

Graton & Knight Company

Established 1851

Worcester 4, Massachusetts

GRATON AND KNIGHT ®

World's Largest Manufacturer of Industrial Leather Products

Ask him for your free copy of this BELTING CATALOG

This manual tells you how to select, install and maintain all types of leather belting.

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PROLONG BELT LIFE

THE ORIGINAL BELT DRESSING IN A SPRAY CONTAINER

Stop belt slipping the safe way by spraying them with famous SPRAZ-ON. Easy, neat and economical for flat, V and round belting of leather, rubber or fabric. One can holds 12 oz., covers approximately 350 sq. feet of belting.

GRAKO IN BULK

is available in 5-gal. and 50-gal. drums — also in pint, quart and gallon cans.

G&K BAR BELT DRESSING

made from tested ingredients, will reduce belt slipping immediately. Two sizes: large "One Pound" bar and Handy bar.

BELT CEMENTS

For strong, flexible laps and plies, specify Neptune® for waterproof or Royal Worcester® for quick drying.

B-6

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 35 • NUMBER 8 • NOVEMBER, 1953

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The PAPER INDUSTRY is indexed regularly in **Engineering Index** and **Industrial Arts Index**. An index to each volume is issued annually by the publisher as a part of the April number.

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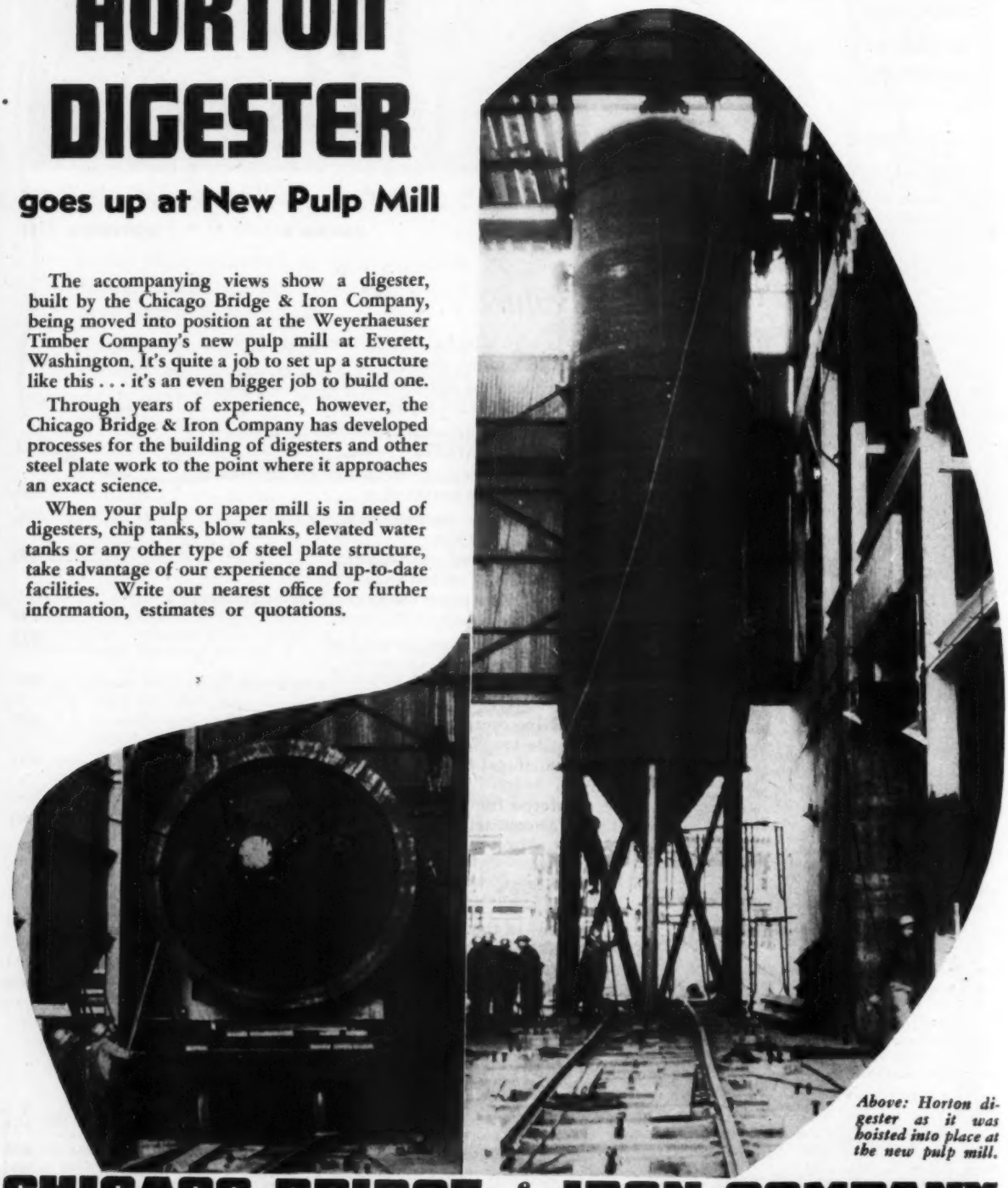
HORTON DIGESTER

goes up at New Pulp Mill

The accompanying views show a digester, built by the Chicago Bridge & Iron Company, being moved into position at the Weyerhaeuser Timber Company's new pulp mill at Everett, Washington. It's quite a job to set up a structure like this . . . it's an even bigger job to build one.

Through years of experience, however, the Chicago Bridge & Iron Company has developed processes for the building of digesters and other steel plate work to the point where it approaches an exact science.

When your pulp or paper mill is in need of digesters, chip tanks, blow tanks, elevated water tanks or any other type of steel plate structure, take advantage of our experience and up-to-date facilities. Write our nearest office for further information, estimates or quotations.



Above: Horton digester as it was hoisted into place at the new pulp mill.

Left: The Horton digester still on the railroad flatcar as it arrived at its destination.

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Seattle, 1.....1327 Henry Building
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Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada: HORTON STEEL WORKS LIMITED, FORT ERIE, ONT.

Something New in Sizing

KELGIN XL, a new development in paper surface sizing, can be applied on either the calender stack or size press as a 0.75% - 3.5% solution. It effectively increases surface density, develops finish and improves smoothness. High gloss mottle-free printing at substantially reduced ink costs. KELGIN XL sizing effectively increases grease resistance of paperboard and glassine stock.

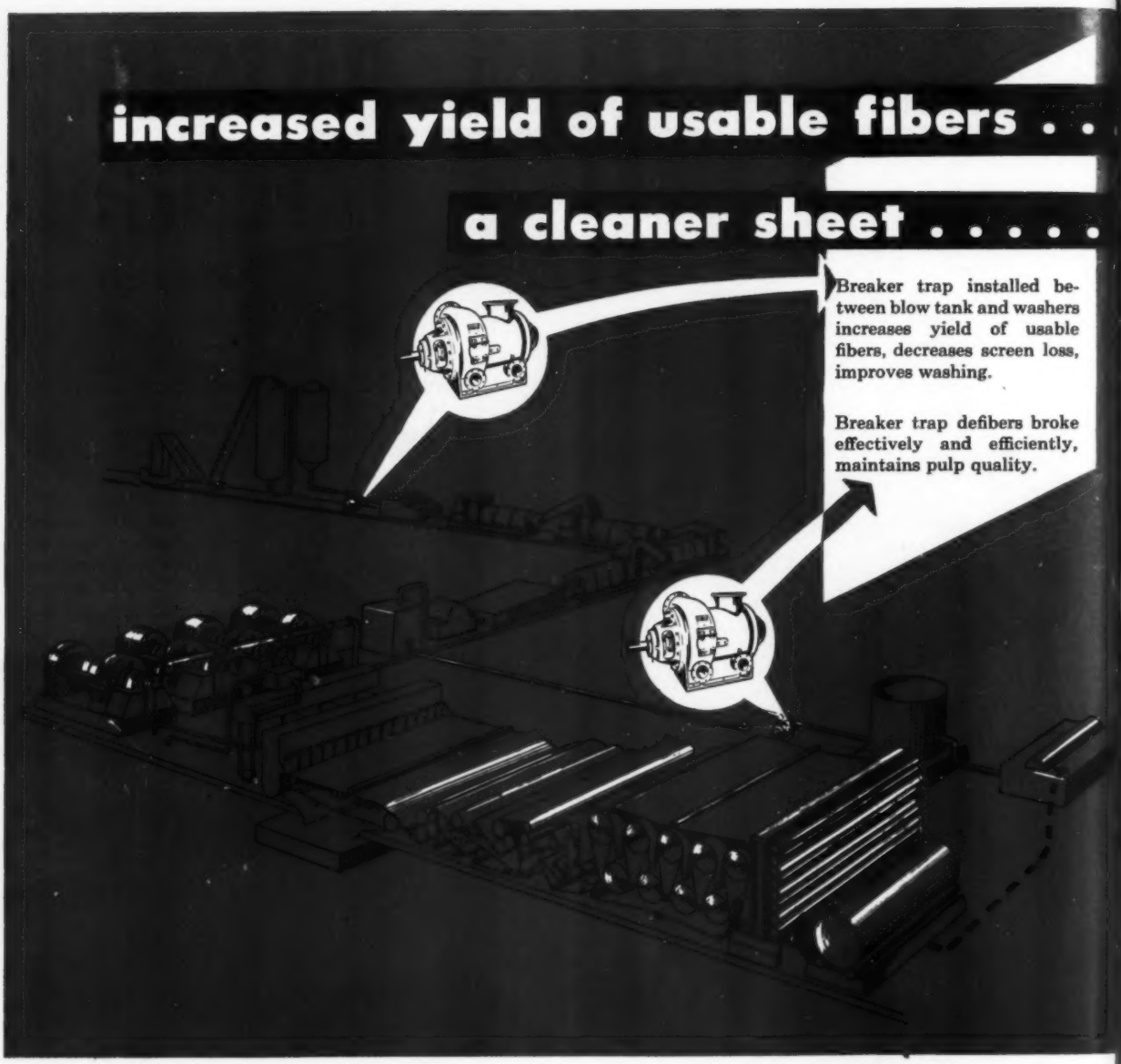
If you have sizing problems in one of these applications, ask your nearest Kelco office to send a Kelco technical paper representative to demonstrate the advantages of KELGIN XL.

KELGIN XL . . . a product of KELCO company

31 Nassau Street, New York 5, N.Y.
20 N. Wacker Drive, Chicago 6, Illinois
530 W. Sixth Street, Los Angeles 14, Calif.
Cable Address: KELCOALGIN — NEW YORK

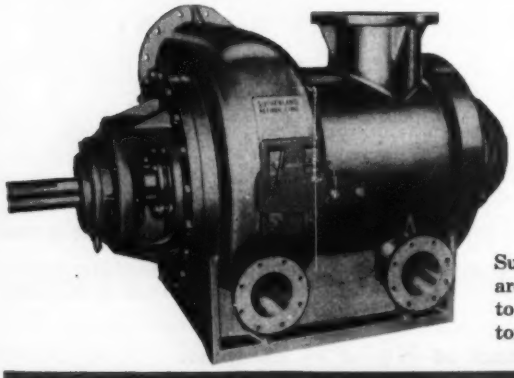
increased yield of usable fibers . . .

a cleaner sheet . . . . .

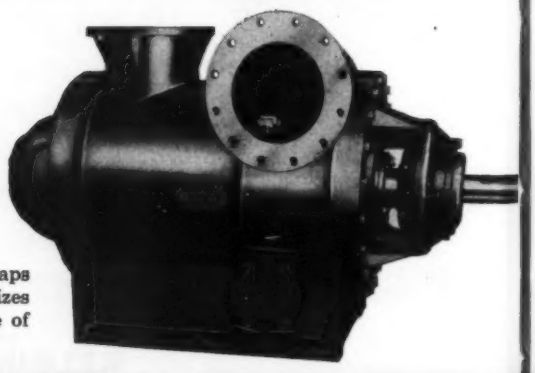


Breaker trap installed between blow tank and washers increases yield of usable fibers, decreases screen loss, improves washing.

Breaker trap defibers broke effectively and efficiently, maintains pulp quality.



Sutherland breaker traps are available in three sizes to cover a wide range of tonnage requirements.



with the SUTHERLAND BREAKER TRAP
at a saving in power costs

The Sutherland Breaker Trap was specifically designed to do a job that had, previously, been done haphazardly by a variety of methods. Since it is designed *for the job* it means improved efficiency and operating economy, a fact that is being continually demonstrated in actual mill operations.

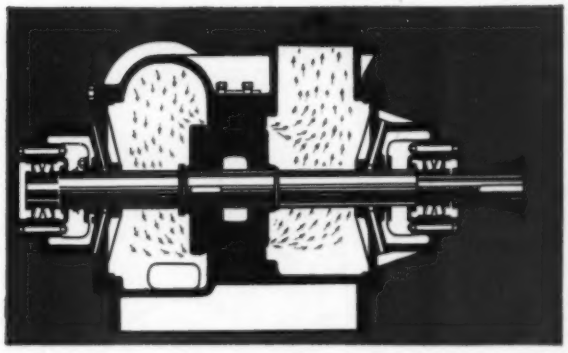
WHAT THE SUTHERLAND BREAKER TRAP DOES:

1. **Selectively defibers pulps, reducing oversize fiber bundles and thus increasing the yield of usable fibers.**
2. **Protects itself and the equipment that follows by removing large particles of both magnetic and non-magnetic tramp metal by centrifugal action.**
3. **Leaves intact other waste materials such as large dirt particles, cellophane, etc., so that they may be removed by standard screening methods, thus making for cleaner sheet.**

POWER COSTS

Since the Sutherland Breaker Trap is specifically built for these operations, it yields a substantial power saving over other equipment.

WRITE FOR ILLUSTRATED BOOKLET EXPLAINING OPERATION AND ADVANTAGES IN DETAIL.



Cut away view showing operation of Sutherland Breaker Trap.

APPLICATIONS

In the Pulp Mill:

High yield kraft

Defibering kraft pulps prior to washing

Following the Pulper:

Defibering waste papers

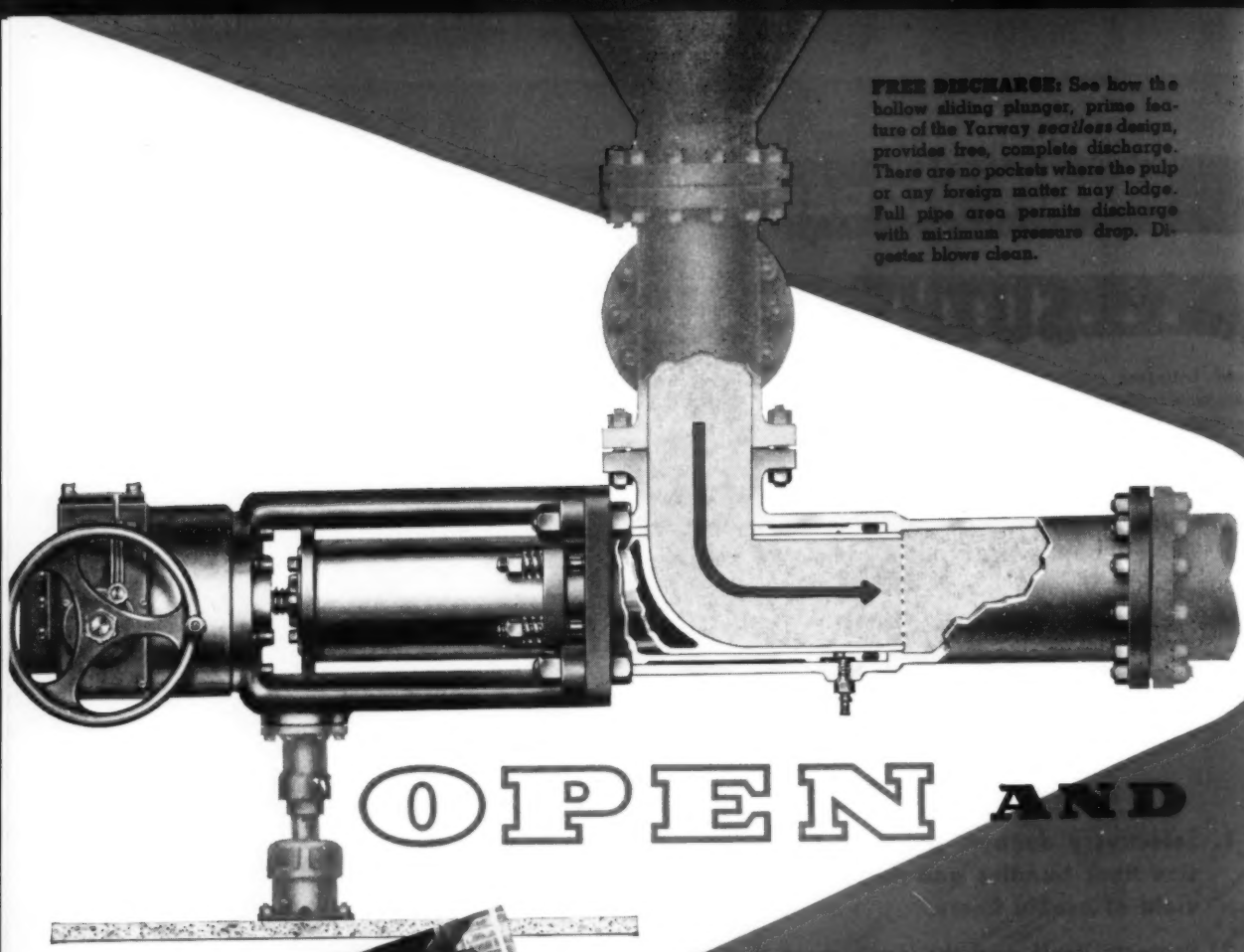
Defibering dried pulps

Defibering broke

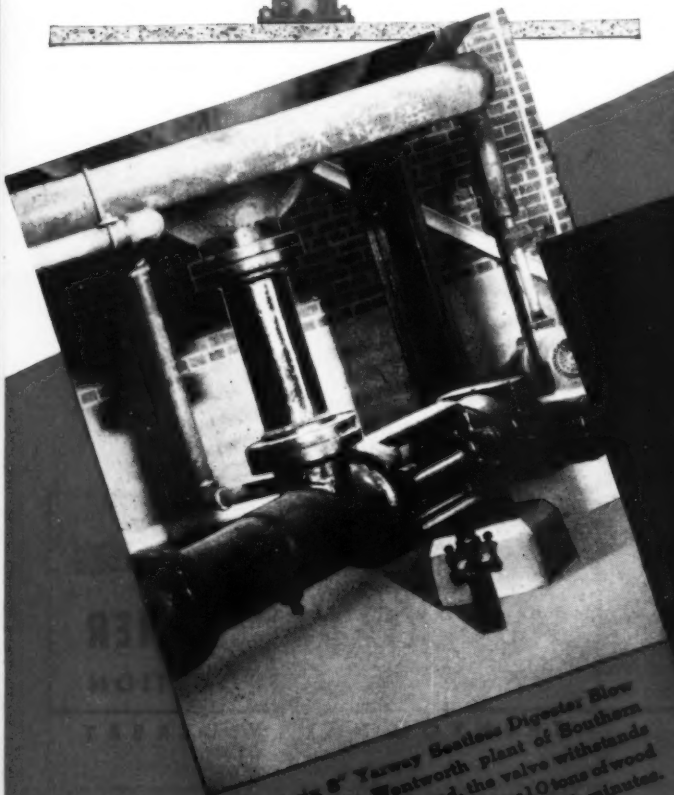
SUTHERLAND REFINER CORPORATION

TRENTON 8, NEW JERSEY

FREE DISCHARGE: See how the hollow sliding plunger, prime feature of the Yarway *seatless* design, provides free, complete discharge. There are no pockets where the pulp or any foreign matter may lodge. Full pipe area permits discharge with minimum pressure drop. Digester blows clean.

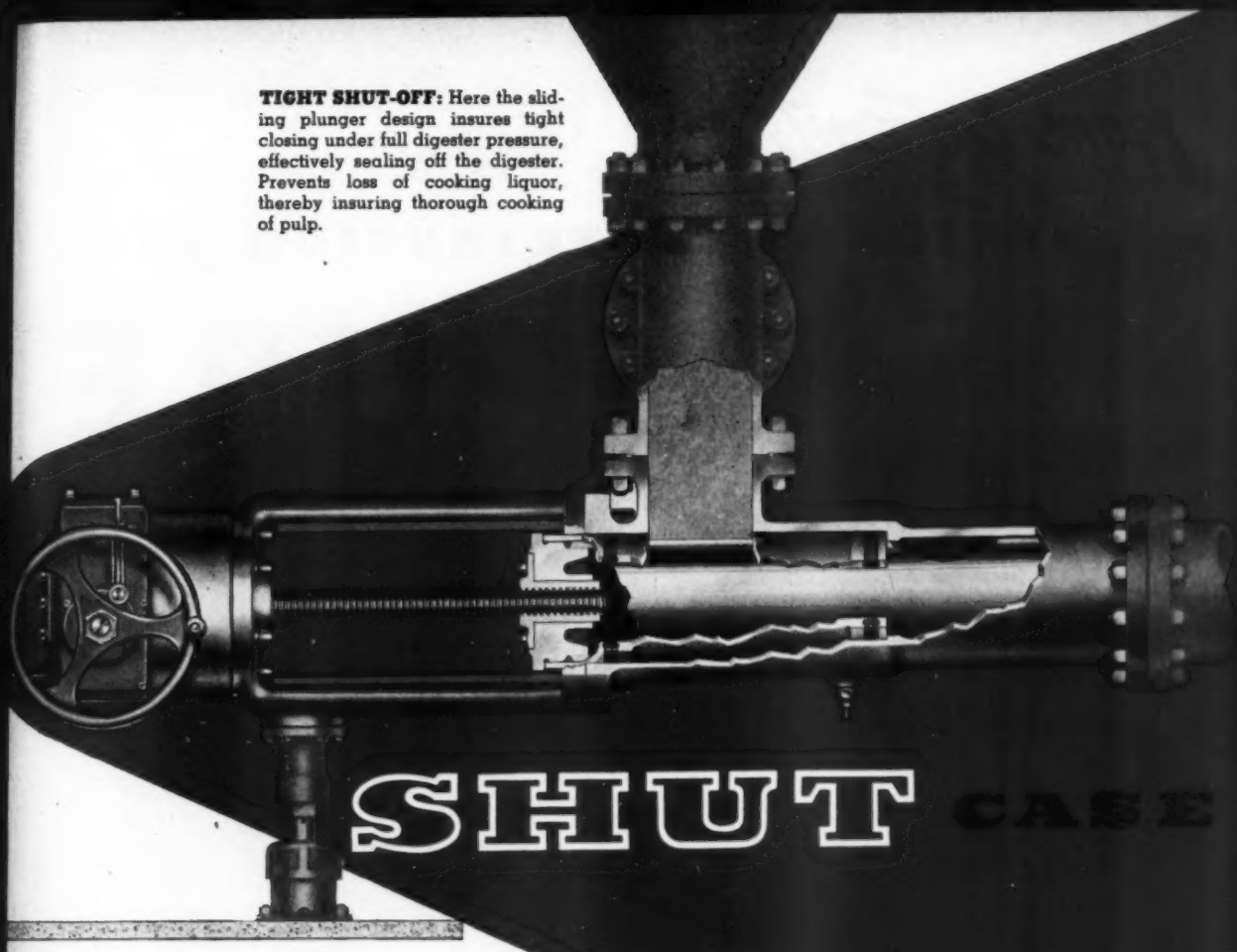


OPEN AND



One of six 8" Yarway Seatless Digester Blow Valves at Port Wentworth plant of Southern Paperboard Corp. Closed, the valve withstands 150 psi. pressure; open, it passes 10 tons of wood pulp and used cooking liquor in 12 minutes.

Battery of 5 Yarway Seatless Digester Blow Valves installed on digesters at plant of Coosa River Newsprint Co., Coosa Pines, Alabama.



TIGHT SHUT-OFF: Here the sliding plunger design insures tight closing under full digester pressure, effectively sealing off the digester. Prevents loss of cooking liquor, thereby insuring thorough cooking of pulp.

SHUT CASE

FOR YARWAY DIGESTER BLOW VALVES

These two cross-section views of the Yarway Seatless Digester Blow Valve, in open and closed positions show two good reasons (free discharge and tight shut-off) why Yarway Valves are being used on more and more pulp digesters.

Besides the advantages inherent in the seatless design, Yarway Blow Valves have certain other important features:

FAST OPERATION—by remote push button control, these motor-operated valves speed digester discharge . . . in one typical mill, resulted in an increase of 20 tons of pulp a day.

RUGGED CONSTRUCTION—built to withstand the shock and wear of toughest service. Frequently take up to 6000 blows before reconditioning.

MODERN METALLURGY—such as lower gland (sleeve) of chromium nickel stainless steel and sliding plunger of hardened stainless steel—resists wear and chemical action.

If you are interested in *safety in operation, increased production, low maintenance, savings in labor*—then write for Yarway Bulletin B-440.

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from Du Pont...

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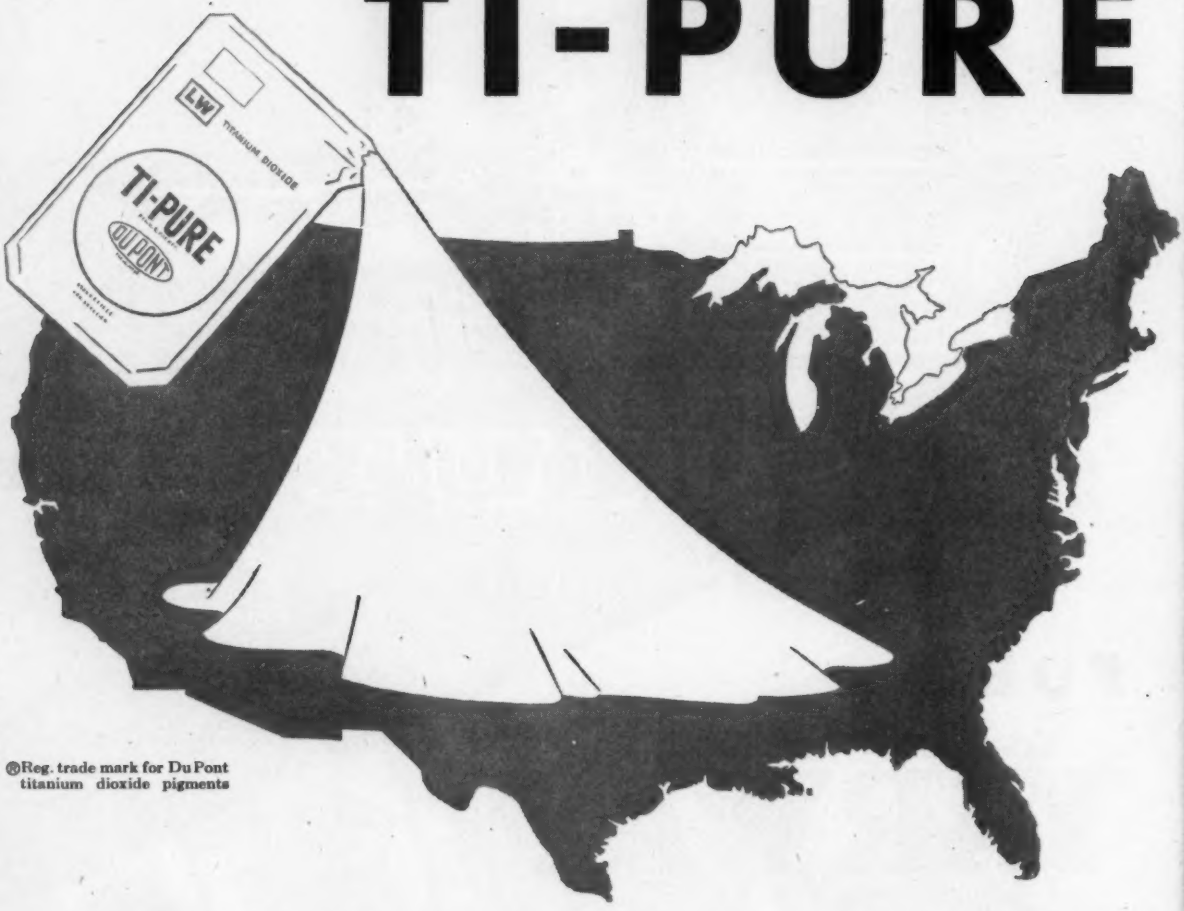

®Reg. trade mark for Du Pont titanium dioxide pigments

QUALITY TITANIUM DIOXIDE PIGMENTS FOR PAPER

ON JANUARY 1, 1954 Du Pont will begin exclusive, national distribution of "Ti-Pure" titanium dioxide pigments to the paper industry. A record of over 20 years' successful performance has established "Ti-Pure" LW as one of the finest pigments ever offered to the trade. Whatever your pigment requirements you can count on satisfaction from Du Pont—the *one source* for "Ti-Pure" titanium dioxide pigments.

And remember, when you order "Ti-Pure" you also benefit from Du Pont's experience and technical facilities. Its modern laboratory, for example, is your assurance of getting expert technical aid when you need it—*and* a top quality pigment designed to do the job you have in mind. For more information, just call our nearest district office or write to: E. I. du Pont de Nemours & Co. (Inc.), Pigments Department, Wilmington 98, Delaware.

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. . . through Chemistry

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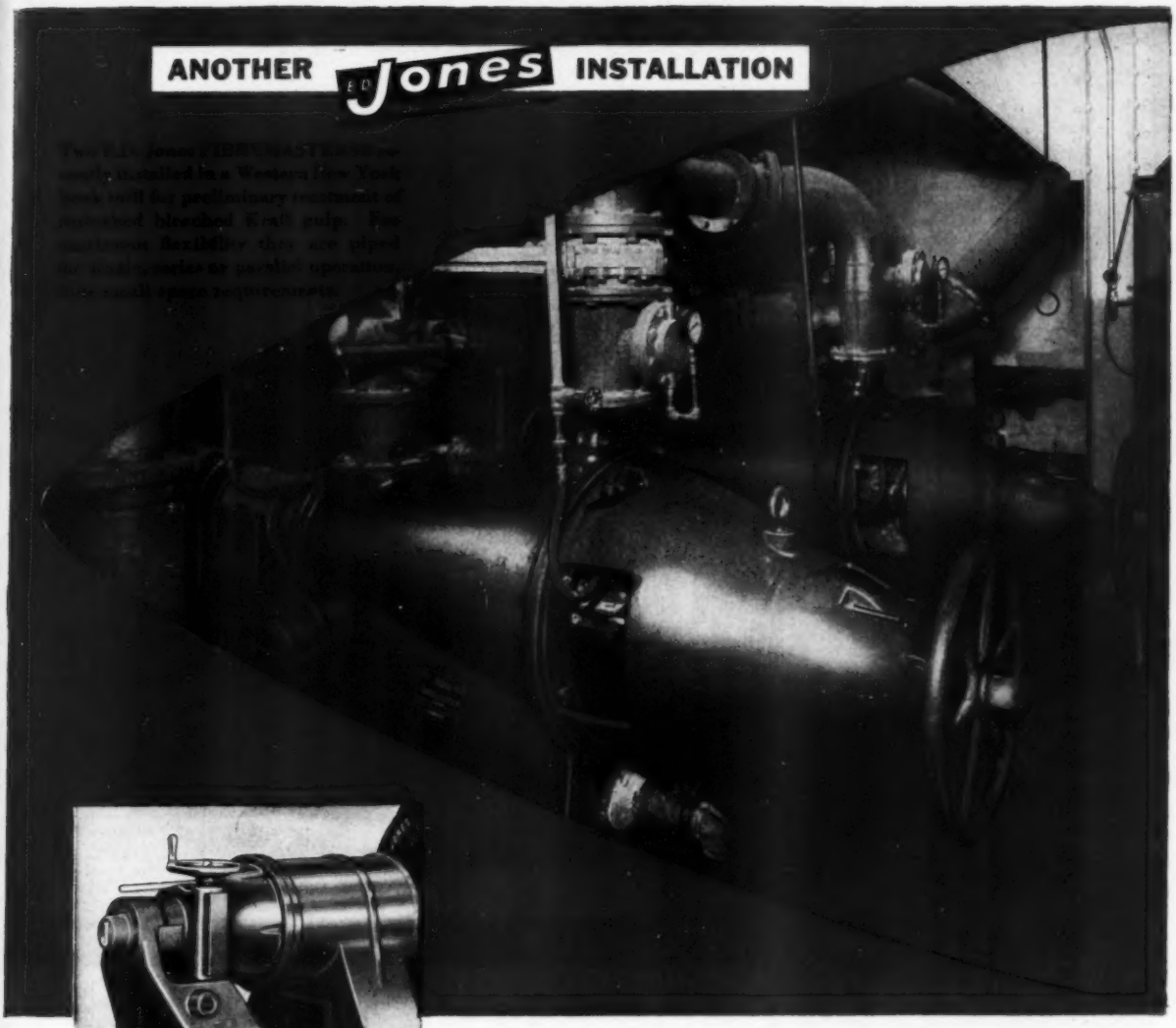
ANOTHER E.D. Jones INSTALLATION



Now available with ACCRU-SET®
— automatic plug adjustment

This latest triumph of Jones engineering provides completely automatic, completely reliable finger-tip control of plug adjustment for uniform, predetermined power throughout your stock run. Guarantees more uniform stock treatment, less operating horsepower, protection for plug and shell bars if power or stock flow fails.

Easily installed on any Jones Jordan, Fibremaster or Refiner. Write today for details.

MINIMUM Floor Space MAXIMUM Results

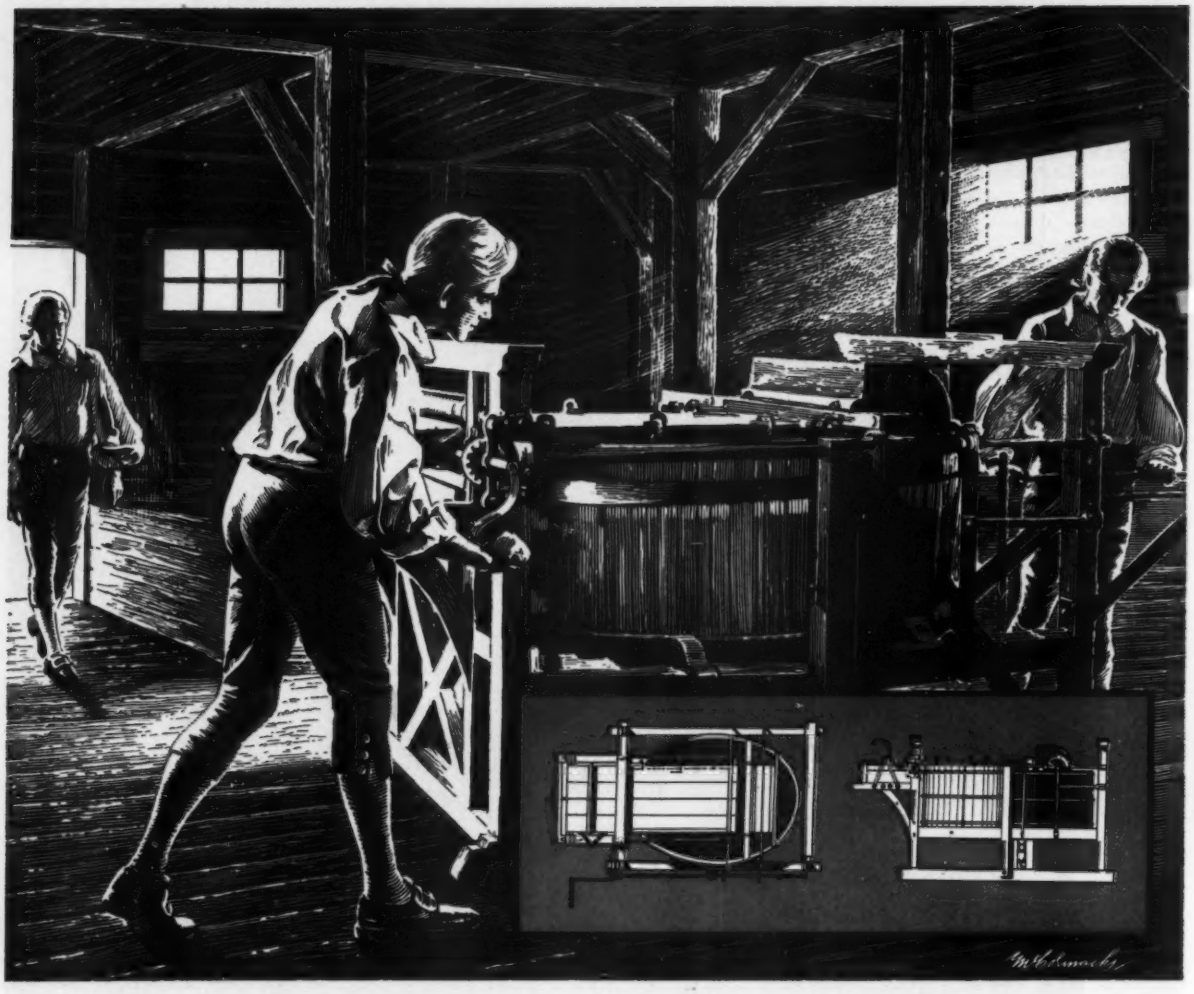
The simplified, rugged design of the FIBREMASTER requires relatively little floor space. Yet it has *twice* the capacity of the famous Jones High-Speed Refiner . . . and without sacrificing any of the features that have made the smaller machine so popular.

As a general utility unit on all stocks from news to rag, the Fibremaster combines flexibility, improved stock control, economy of power and low maintenance cost. Ask your Jones representative for details or write for Bulletin *EDJ-1035.*

E.D. Jones

E. D. Jones & Sons Company
Pittsfield, Mass.

BUILDERS OF QUALITY STOCK PREPARATION MACHINERY



Papermaking Went Into High Gear With This Machine in 1798...

An important event in the history of papermaking was Nicholas-Louis Robert's invention of the paper machine over a century and a half ago. No longer would the slow methods of forming paper by hand limit size and quantity of paper sheets. Robert's machine formed paper of continuous length upon an endless woven-wire cloth which retained the matted fibers. Today more complex machines, operating on the same principle, produce a tremendous volume of paper. Helping maintain its quality are high-grade raw materials produced by A. E. Staley Manufacturing Company, supplier to leading mills for more than 30 years. Discover the many advantages Staley can offer *you*. See your supplier or write for details today.

Quality Staley® Products for Papermakers

Staley Sizing Starches
A full range of starches and dextrins for beater, surface and calender sizing.

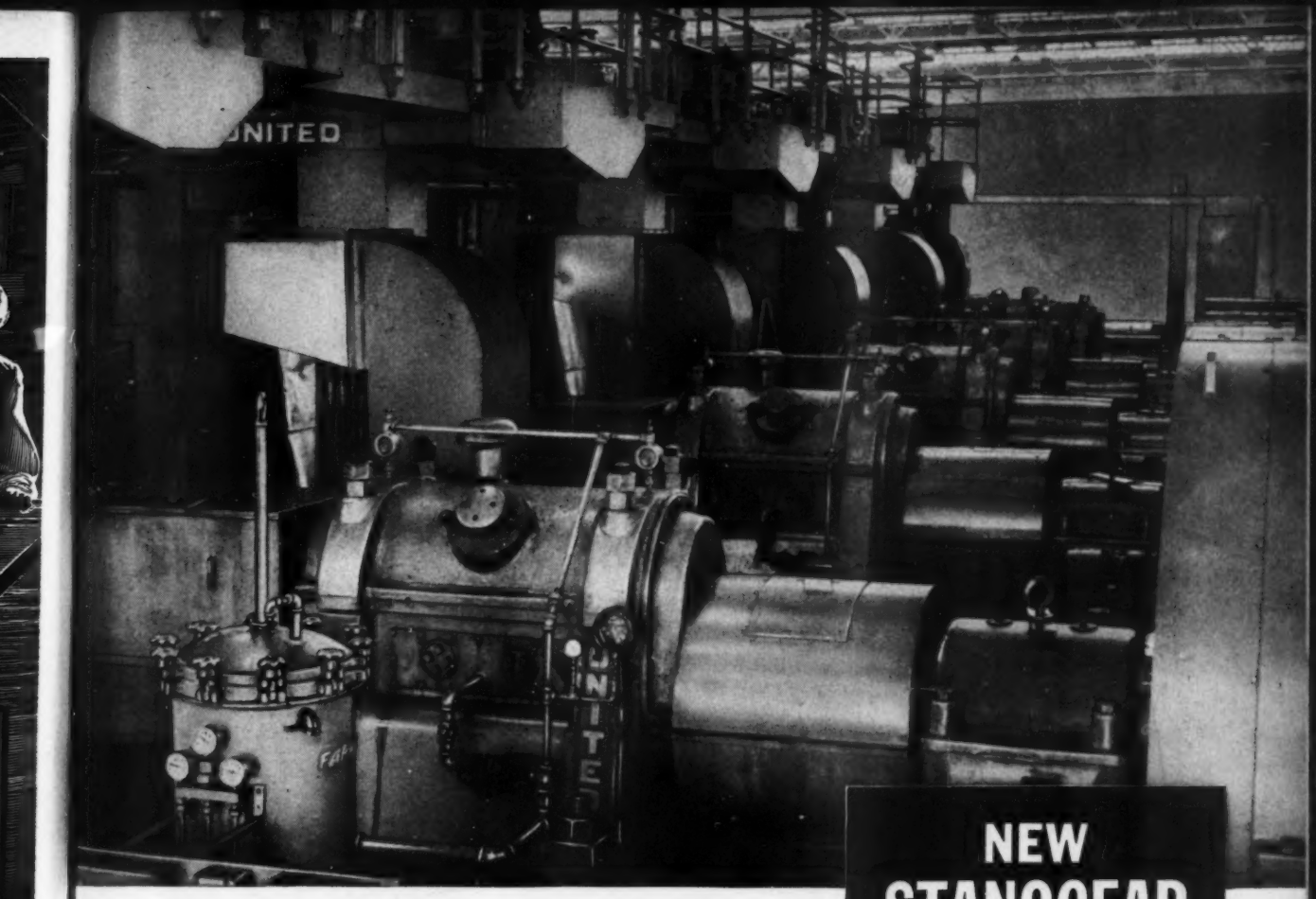
Staley Corrugating and Laminating Adhesives
Corrugating starches, special laminating and bag adhesives.

Staley Coating Adhesives
Starches and Dextrins give better results for machine or regular brush coating.

Staley Plasticizers
"Sweetose"® and Staley's corn syrup are ideal softening agents for glassine paper.

PRODUCTS FROM CORN
Staley's

A. E. Staley Mfg. Company, Decatur, Ill.



NEW STANOGEAR
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Compounds

NOW . . . 7 ways better for extreme-pressure lubrication . . .

New and improved STANOGEAR Compounds have been developed to meet the requirements of an increasing variety of tougher extreme-pressure lubricating jobs found throughout industry, today. The result of several years of special research and field test work, these outstanding products have proved in actual service their ability to provide these important advantages:

1. Higher load carrying capacity. Use of improved extreme-pressure additives in STANOGEAR Compounds provide a greater anti-weld property. This results in the higher load carrying capacity which these products have demonstrated in actual service.

2. Superior retention of load carrying capacity. In service tests, STANOGEAR Compounds have proved superior to conventional extreme-pressure lubricants in ability to maintain a high load carrying capacity over extended periods of service.

3. Freedom from objectionable deposits. Appropriate base stocks and additives give STANOGEAR Compounds a high resistance to oxidation, thus minimize the formation of deposits.

4. Excellent storage stability. STANOGEAR Compounds contain compounding ingredients which assure excellent stability both in service and storage.

5. Good water separation. STANOGEAR Compounds have demonstrated their superiority to ordinary extreme-pressure lubricants in ability to provide good water separation.

6. Anti-foaming. Under adverse operating conditions, the anti-foam agent in STANOGEAR Compounds has prevented foaming troubles.

7. Versatility. A unique combination of additives in STANOGEAR Compounds equips these products for various industrial gear applications where extreme-pressure lubricating properties are necessary. To meet varying viscosity requirements, STANOGEAR Compounds are available in eight viscosity grades.

The Standard lubrication specialist in your area of the Midwest will be glad to give you more information about the new STANOGEAR Compounds. You need only phone your local Standard Oil office. Or write: Standard Oil Co., 910 South Michigan Avenue, Chicago 80, Illinois

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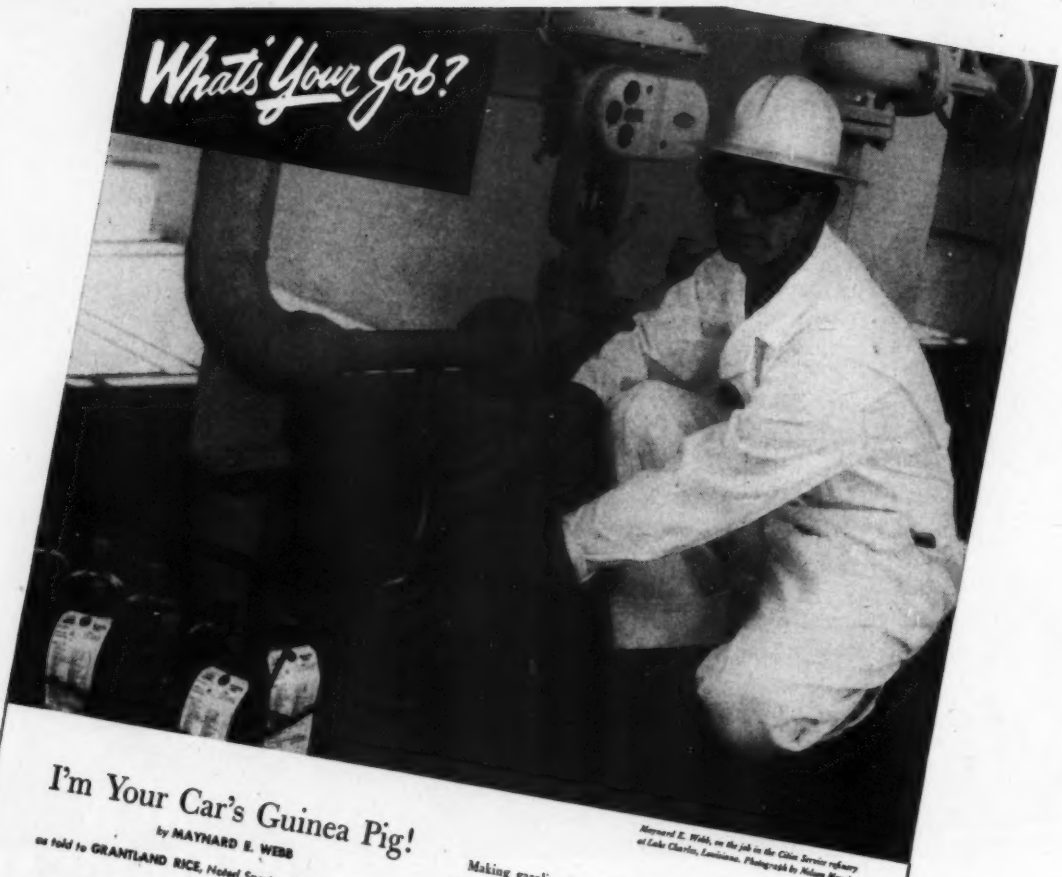


Maynard E. Webb, on the job in the Cities Service refinery at Lake Charles, Louisiana. Photograph by Adam Harris.

I'm Your Car's Guinea Pig!

by MAYNARD E. WEBB

as told to GRANTLAND RICE, Noted Sportswriter and Commentator

THEY TRY OUT the gasoline ... If our reaction ...

... every 15 minutes, ... from process ... report our findings. ... test up to 20 different ways, and We couldn't be fussier if we were making baby food.

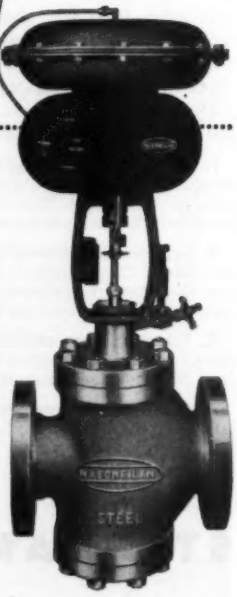
Making gasoline is a lot like making baby food, at ... compression engine is as sensitive to ... formula. When a baby ...

... Of course, is over-simplifying the care we take to turn out a fine gasoline. A book could be written on the subject. But I think you'll agree that we guinea pigs are probably the most important people in this refinery—from your car's point of view, that is.

CITIES SERVICE

Masoneilan 10000 Series Valve and 7000 Series Positioner at work in Cities Service refinery at Lake Charles, Louisiana

If your job is selecting Control Valves



get acquainted with the quality features which distinguish *Masoneilan* Control Valves. Learn about the built-in accuracy, stamina and economy which has induced thousands of quality-conscious companies like Cities Service, all over the world, to select Masoneilan valves as an important element in maintaining the quality of *their* products. Put Masoneilan Control Valves to work for you — helping maintain the quality of *your* product. Complete information on request.

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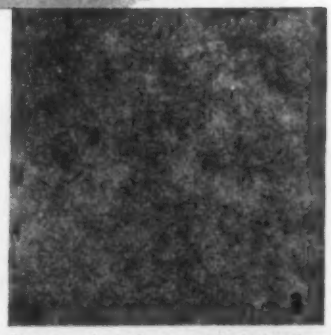
- ✓ A CLEANER PULP
- ✓ OF INCREASED YIELD
- ✓ WITH INCREASED TEARING STRENGTH
- ✓ WITHOUT AFFECTING FIBER LENGTH

SEE THE DIFFERENCE... These unretouched photographs are actual size.

Paper made with fine screen rejects. Note dirt, shives and large fiber bundles.

Paper made with rescreened rejects. Only the largest particles, 8% of the rejects, are removed. Note the large number of shives which passed through the screen.



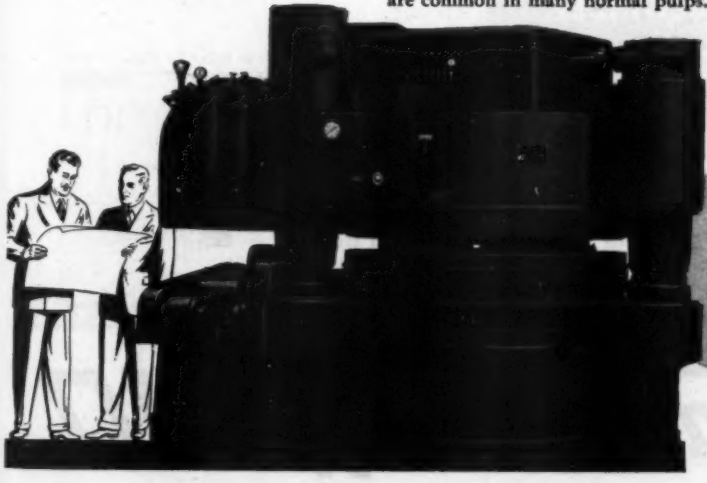
Paper made with screened, Curlated rejects. 99.4% of the fine screen rejects are in this sheet. Note improvement in cleanliness as a result of Curlation.

Write for more detailed information. See the results obtained from your own pulp.

Actual mill operation proves Curlation eliminates shives and separates the individual fiber bundles, as well as reducing the sizes of dirt particles. This permits a large portion of the dirt to be removed during washing and thickening operations.

Curlation increases yield by converting shives and fiber bundles into No. 1 pulp. With Curlation you no longer have No. 2 pulp and fine screen rejects. Increased yields of 5% are common in many normal pulps.

Curlation imparts a permanent bend and twist to fibers thereby imparting higher tearing strength to paper made from Curlated pulp. Sheet No. 3 has 60% higher tearing strength than sheet No. 2. Curlator patented action rolls fiber and fiber bundles under pressure without reducing fiber length. Curlation does not cut the fibers.



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Corporation
EAST ROCHESTER, NEW YORK

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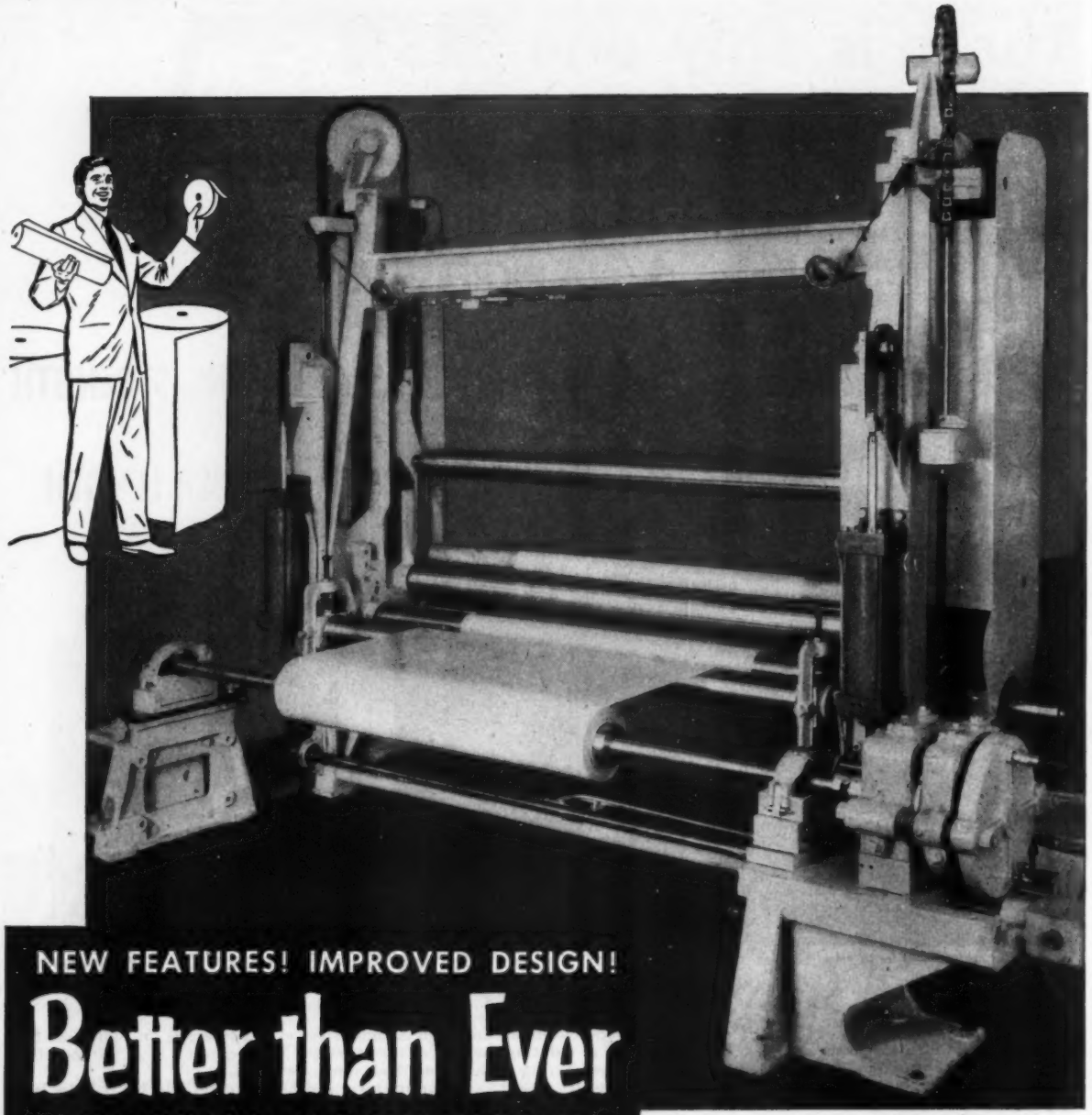

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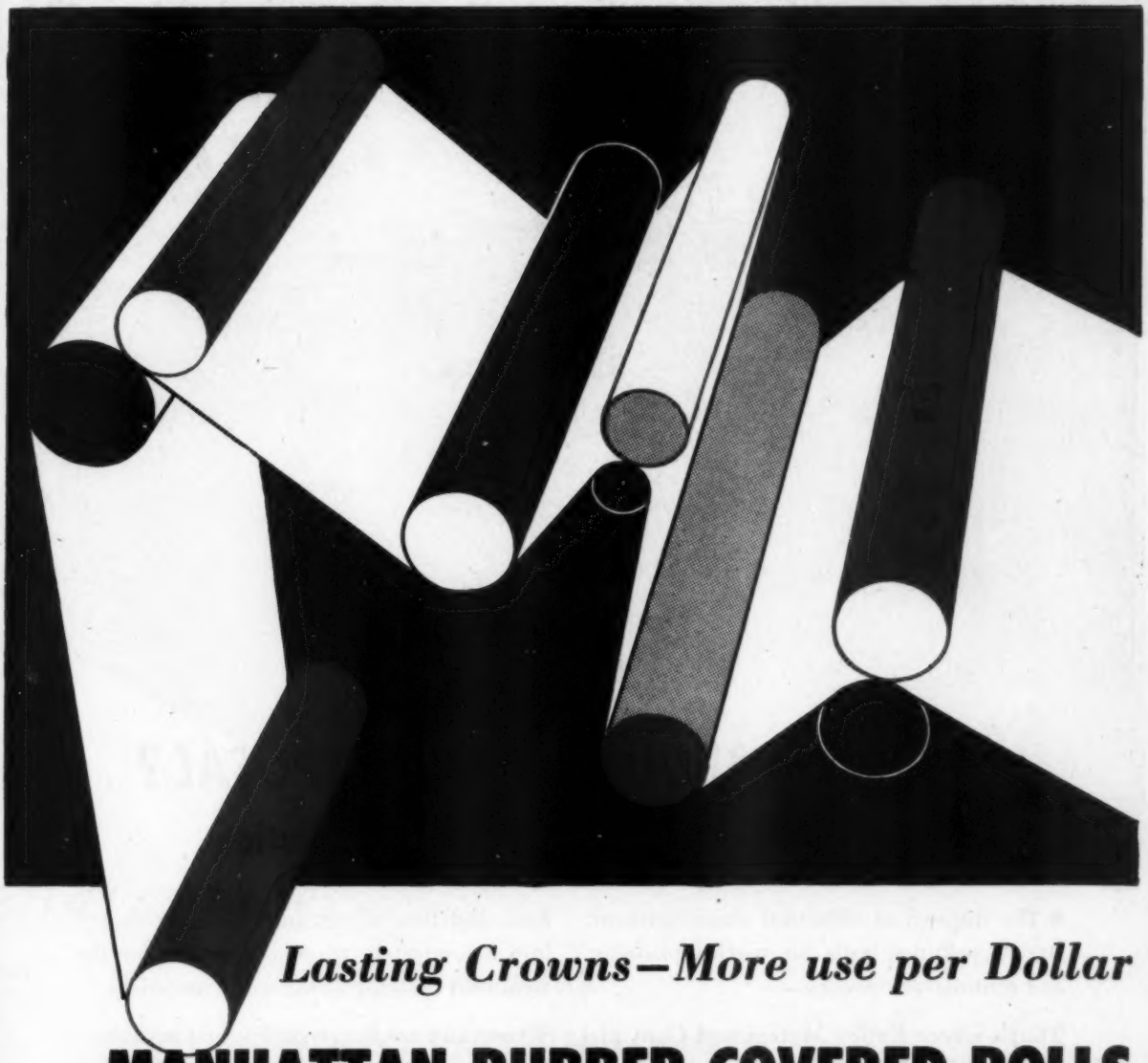
AA-284



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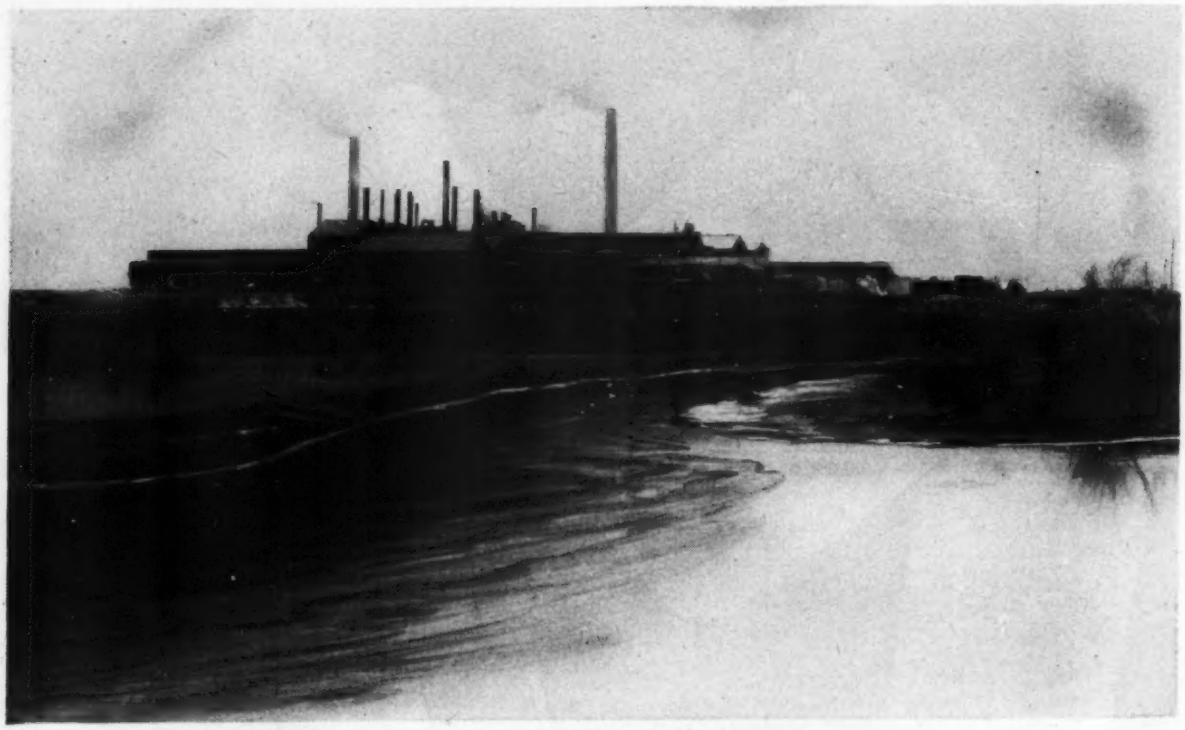

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Bailey Meters Help you to Reduce Pollution

● The disposal of industrial wastes without stream pollution calls for careful planning and continuous vigilance.

That's where Bailey Meters and Controls come in. We measure the flow and pH of sewage, sludge, and industrial wastes flowing in open channels or pipe lines. These and other factors, such as levels, rates of chemical feed, and flow of air, may be co-ordinated into a completely automatic system for the treatment and disposal of waste materials.

When you want fast, complete and authoritative answers to the measurement and control aspects of your waste disposal problems, reach for your phone and call your local Bailey Engineer. Offices in all principal industrial centers.

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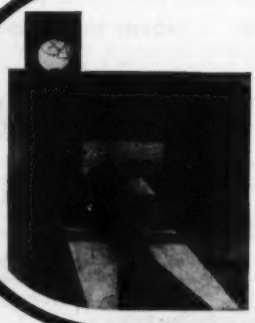

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These indicating, recording and integrating meters are suitable for measuring industrial wastes, sewage, sludge, corrosive liquids, and irrigation water flowing in all types of open channel primary metering devices, such as Venturi flumes, weirs, or nozzle flumes. Electric or pneumatic telemetering permits location of receivers wherever desired. Ratio of flows and chemical feeds may be controlled automatically.

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*Shown in illustration above

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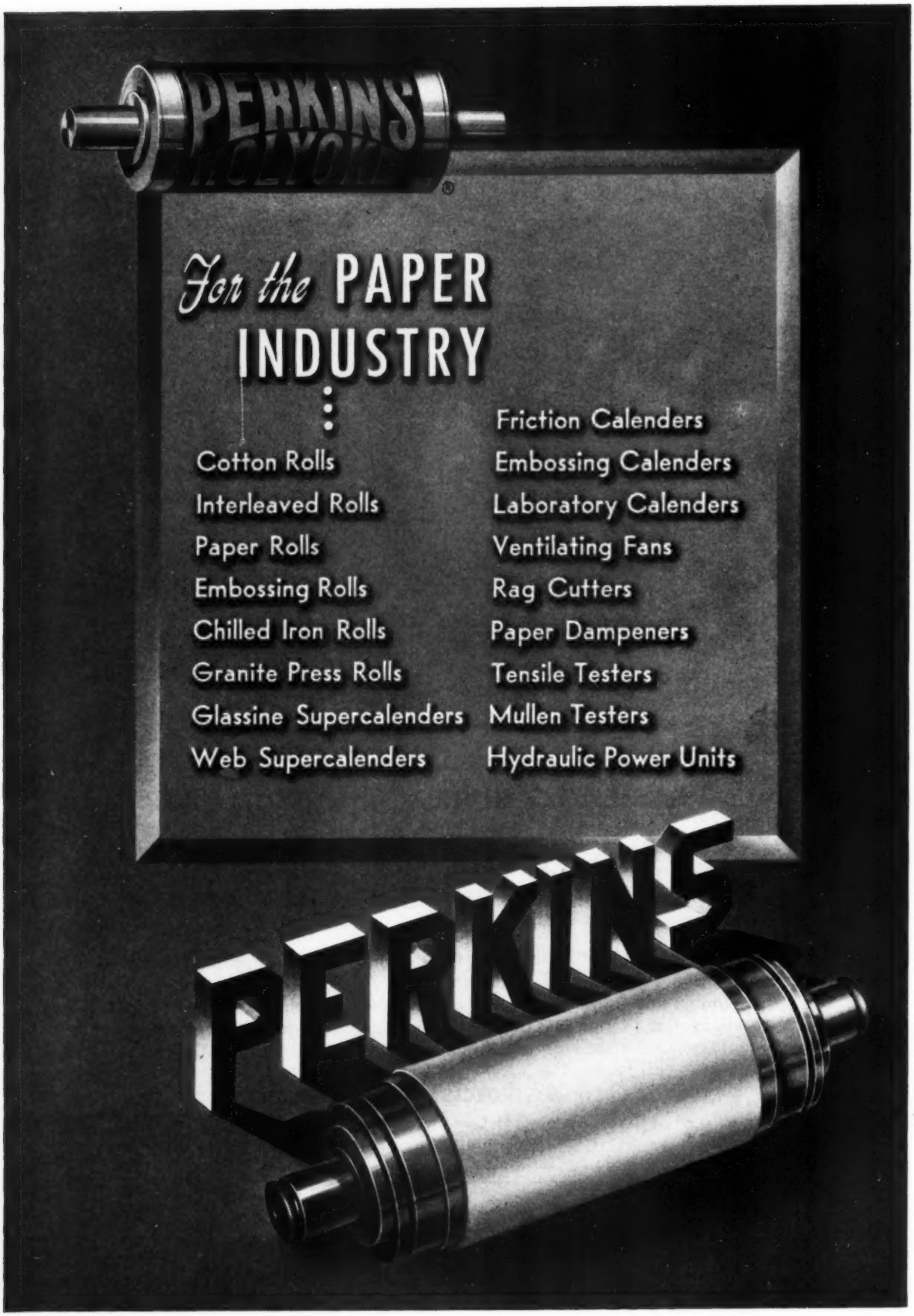
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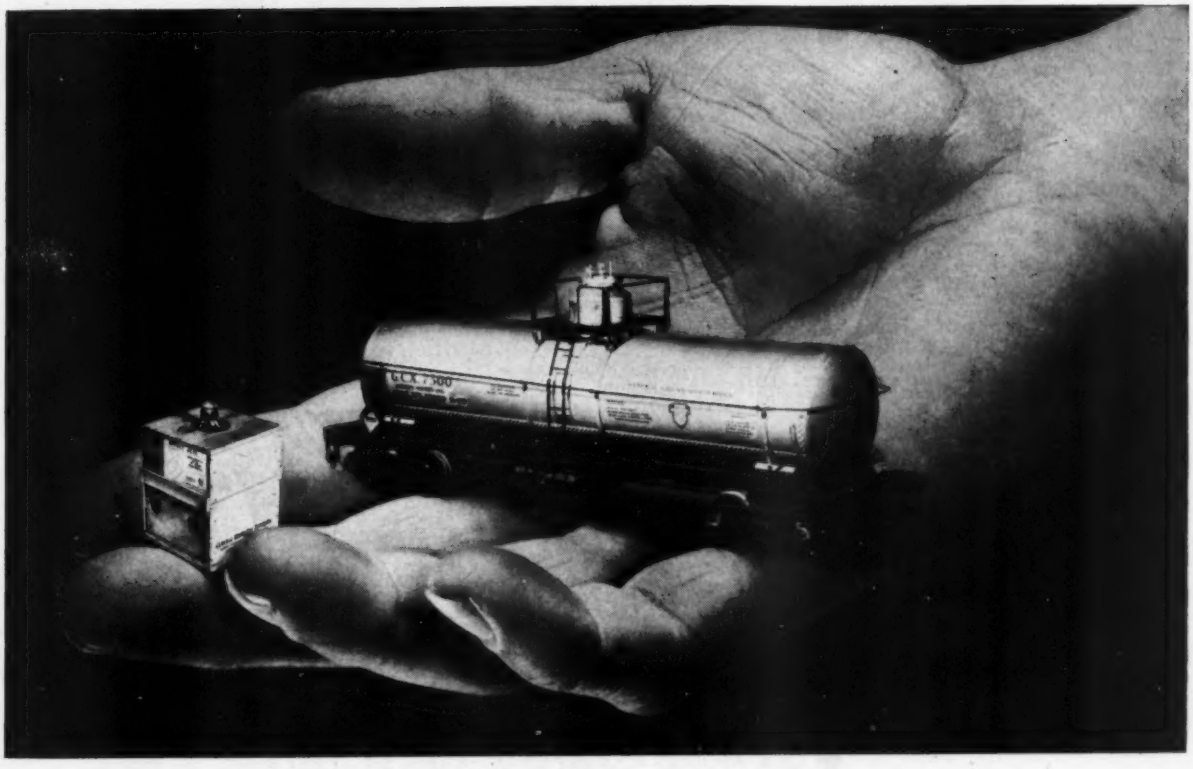
PERKINS

use acids?



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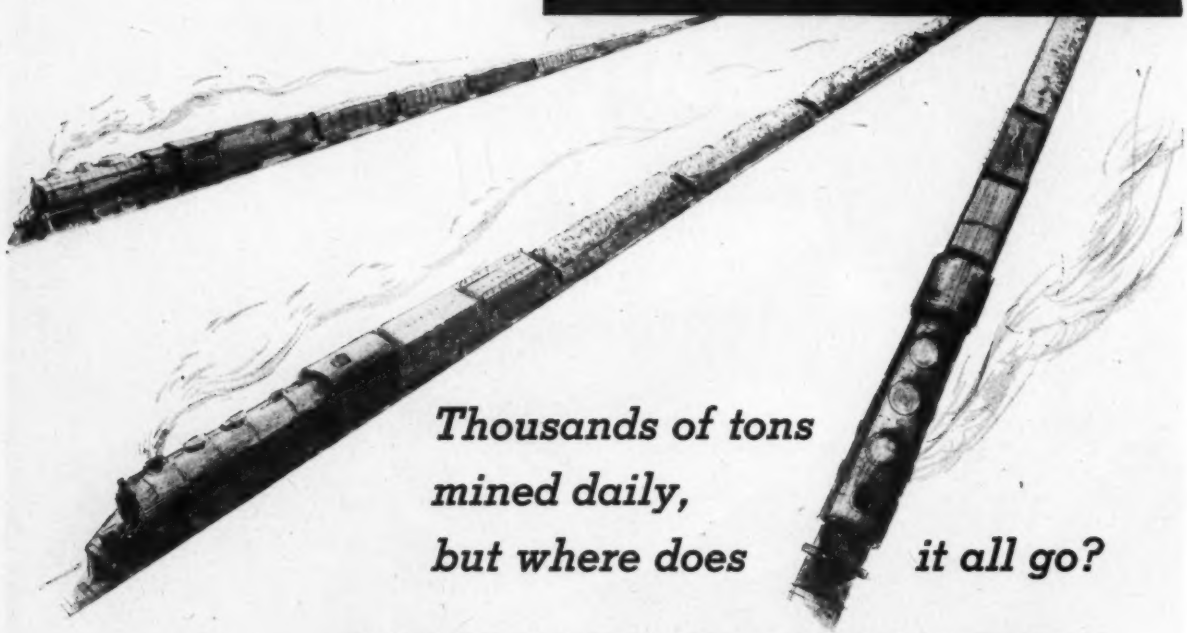
Sulphur



Thousands of tons mined daily, but where does it all go?

LOOK AROUND YOU and let your glance fall on any object. The chances are 1000 to 1 that sulphur played an important role in its manufacture, either as a component part of the finished product or as a processing element.

Take, for example, the very magazine you are reading. If it's average size it weighs about 1 pound. Made largely of sulphite pulp it required about 0.1 pounds of sulphur in its manufacture.

Multiply this 0.1 pounds of sulphur by the thousands of magazines turned out every day and you'll get some idea of the tremendous tonnage of sulphur required for this *single* division of industry . . . the sulphite pulp manufacture.

Sulphur has long been called One of the Four Pillars of Industry. Today's need emphasizes this fact more than ever. Sulphur producers are making every effort to get maximum production from existing mines and to develop new sources of sulphur as quickly as possible.

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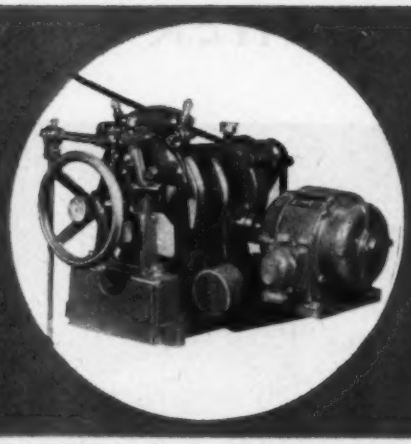
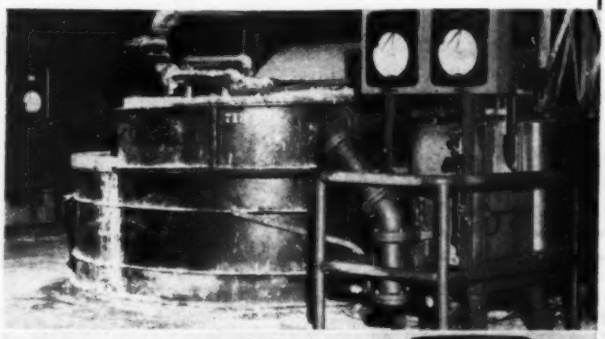
Accurate, Dependable Consistency Control

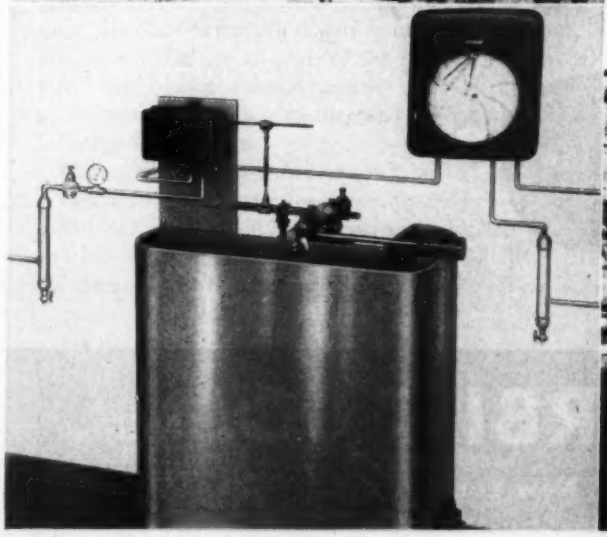
Not Only Where You Want It
But The Way You Want It



PNEUMATIC

The Bird Consistency Regulator with Foxboro Pneumatic Recording Control provides great flexibility plus a permanent, continuous record of both incoming and outgoing consistencies. The Foxboro Stabilog Recorder-Controller may be located wherever most convenient for the operator.





MECHANICAL

The Bird Consistency Regulator with mechanical impulse transferrer provides equally sensitive, precise control — consistency maintained at not more than 0.1% heavier or lighter than desired.

The same accurate, time-tested, stainless steel indicator box is used with both pneumatic or mechanical control. For thick stocks the Bird Screw Type Indicator is equally effective.

Ask us to make recommendations and estimates for any place in the pulp or paper mill where reliable control of stock consistency means better operation at lower cost.

BIRD MACHINE COMPANY
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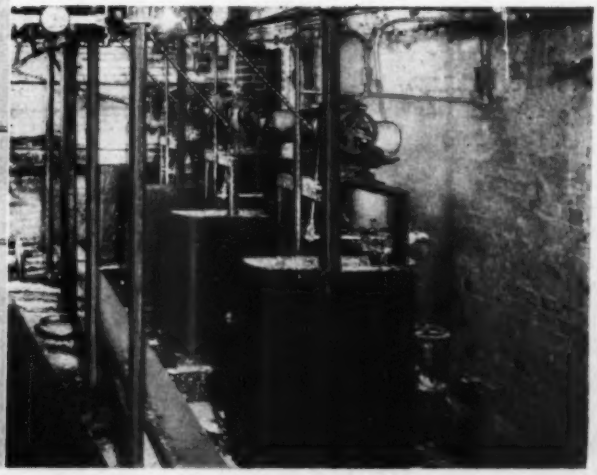

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The Paper Industry

November 1953

Labor too has responsibilities

The obligations of the Company to its Employees—the 1953-subject of the Sixth Bolton Award Contest sponsored by The American Pulp and Paper Mill Superintendents Association—bring out overwhelmingly the workers' basic desire for security and recognition. The opinions expressed in some 150 papers submitted by paper mill workers in this contest, are being regarded as the general view of the workers.

The desire for security and recognition, of course, is an accepted characteristic of mankind. Every one wants—quite commendably so—to be assured of a high level of security for his family unit. The desire for security, however, presents a disturbing element when it supersedes all other considerations and when it expresses a universality and unanimity of thinking as revealed in the 150 papers. Security as an end in itself has never prompted a creative urge. It has never inspired man along the road of great accomplishments.

The exaggerated emphasis on security and recognition also is in direct conflict with labor's apparent renunciation of paternalism attributed to management. It seems to us that all-out security, recognition, and paternalism are all parts of the same general pattern. One cannot demand security—above all—and at the same time renounce the need for paternalistic influence or guidance.

Management's paternalistic attitude will of necessity persist as long as labor refuses to accept and recognize individual responsibility as the primary motivation in any industrial endeavor. Individual responsibility is the mainstay of a true democracy. By the same token, it must also be accepted as the basic requirement in any industrial establishment.

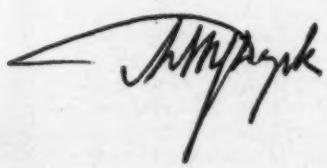
A strong sense of responsibility on the part of labor must precede any demands for security. It will then follow, almost without exception, that the laborer's security too is thereby automatically established.

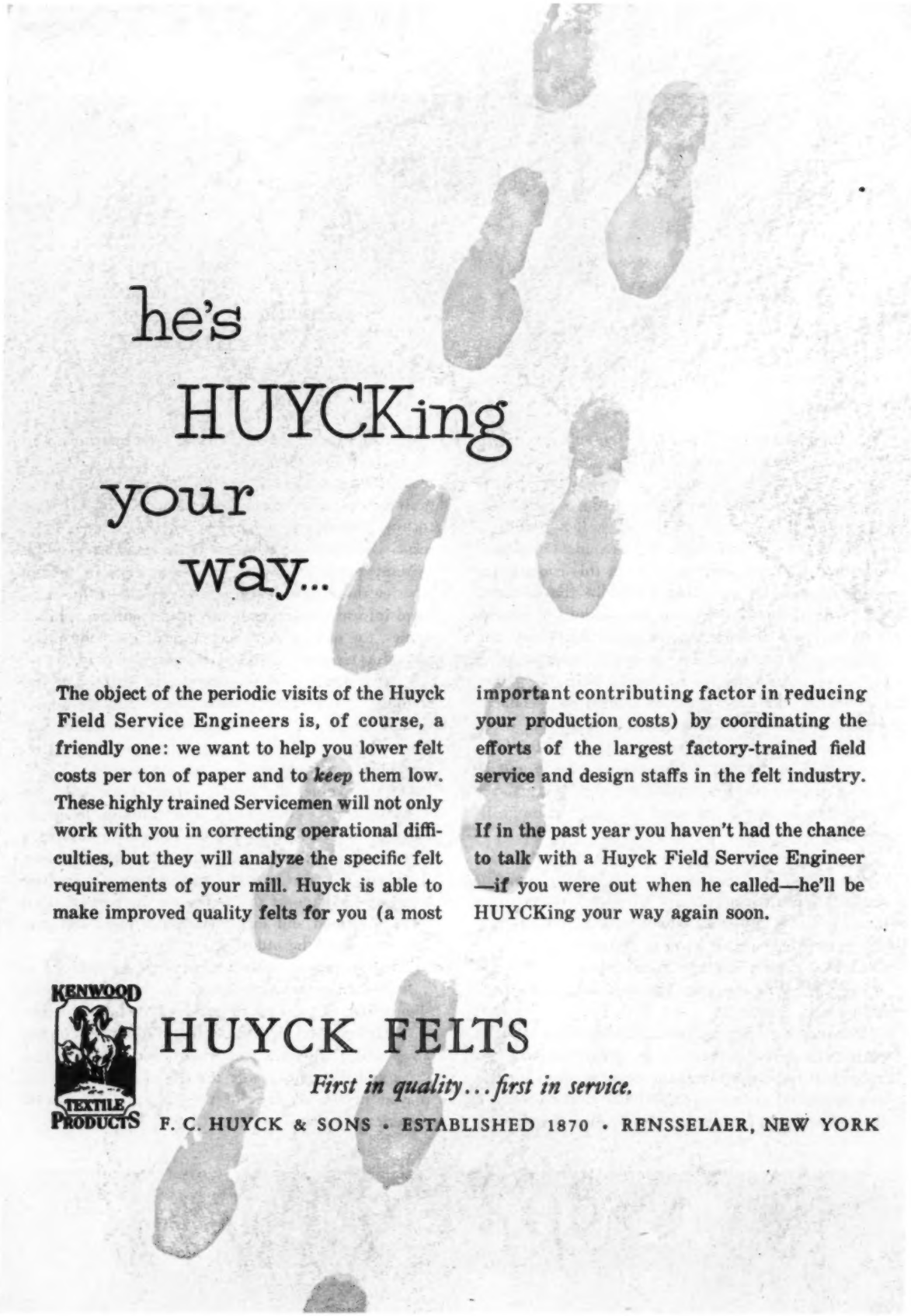
Many papers, however, do show signs of labor's positive thinking as expressed in the desire for first-hand information on company plans, policies, philosophies, the quality and acceptance of company products *vis-a-vis* those of the competing industry.

Labor's desire to receive competent instruction and training, as expressed in some papers, and the appreciation shown for top management-performance further reflect a gratifying approach to maturity and responsibility that deserves to be encouraged.

On the whole, the papers convey great need for a well-directed educational and training program. Labor's hunger for information shows promise of a successful operation of such a program. Management, therefore, seems to have the opportunity of a lifetime to take advantage of this desire on the part of labor to be informed and to become more loyal and proficient units of the industry.

To those among management who are inclined to belittle management's influence in these matters, we should like to refer to an abridged version of Crawford Greenewalt's article published elsewhere in this issue which discusses important executive qualifications and the unique role the business executive has played in the creation of the free and prosperous America of today.





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The object of the periodic visits of the Huyck Field Service Engineers is, of course, a friendly one: we want to help you lower felt costs per ton of paper and to *keep* them low. These highly trained Servicemen will not only work with you in correcting operational difficulties, but they will analyze the specific felt requirements of your mill. Huyck is able to make improved quality felts for you (a most important contributing factor in reducing your production costs) by coordinating the efforts of the largest factory-trained field service and design staffs in the felt industry.

If in the past year you haven't had the chance to talk with a Huyck Field Service Engineer —if you were out when he called—he'll be HUYCKing your way again soon.

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Conflicting trends . . . a medium of cooperation . . . and a dash of cold water

Cross currents at Washington are developing a panorama that is anything but a clear picture as to what will happen to business in the next few months. Excess profits tax prospects, foreign trade studies, anti-trust policies, programs for assistance to business, loud roars from agriculture and labor—all these are a complicated mass of conflicting trends. In other words, there is today no evident trend in Administration circles.

In the face of all these puzzling prospects, the paper industry is finding demand from consumers unabated. All records of tonnage output for a year may be broken, and 1953 will prove to be at least the second highest producing year in history. Demand has resulted in a tendency toward higher prices, already announced in many fields, though on a moderate basis of such figures as $5 per ton. Consumers have trouble getting quick deliveries, as backlogs of orders are rising. This demand is diametrically opposite to the pessimistic prophecies of a business recession emanating from various quarters.

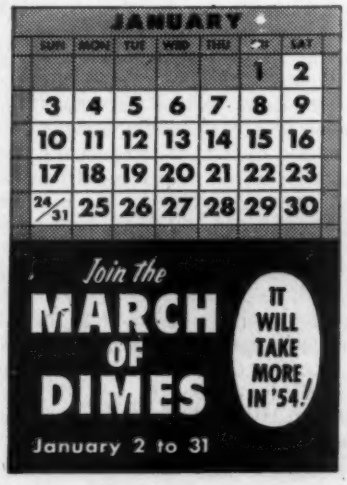
While the Administration is trying to assure the farmers that its policy will eventually be favorable to agriculture, the opposition is harping on the recent Wisconsin election of a Democrat in a chronic Republican district. Labor is complaining because its representative on the cabinet was not allowed to dictate industrial legislation to the interest of the unions, and the Secretary of Commerce, Mr. Weeks, has set up a new program for the aid of business.

While the Administration is attacked by labor for its friendliness to business, the other side of the picture is the fears of business that too great leeway is being given to the elements opposed to maintenance of a profit economy. The role of the peace-maker again is one of being attacked from both sides.

Advice from business

Secretary Weeks, in establishing a new Business and Defense Services Administration, has put into effect a general program of setting up a medium of cooperation between business and government. An essential feature of the program is the utilization of industry advisory divisions composed of representatives of private business and the career men of government. Included is a Forest Products Division. The establishment of these divisions can be based on the success of the paper industry in forming a special council for the Department of Commerce in the previous Administration, when friendly contacts were established. No great accomplishment resulted at that time, but with he new Administration the value of such councils is now being recognized and expanded to all industry. Here again, the paper industry helped point the way to sane utilization of industry's brains in the conduct of the nation's business.

What will happen to the tax picture is a factor in the present business uncertainty. How far Chairman Reed of the House Ways and Means Committee will be able to sustain his demand that the Administration carry out its pledges for tax cuts remains to be seen. However, Mr. Reed is busily engaged in trying to get support for his program to permit some present excise taxes on various products to expire, as provided by present law, on March 31, 1954. He wants to see other excise taxes cut in half, reductions in the present corporate tax, and a freeze of the present social security taxes at 1½ per cent each for employee and employer.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IT WILL TAKE MORE IN '54!
January 2 to 31

Direct opposition

This program is in direct opposition to the reported plans of the Administration to balance the budget by continuance of various present taxes, or by the substitution of new methods of raising funds. Various paper companies would be affected by the elimination of the excess profits tax, or even its partial curtailment, with the result that corporation surpluses would be increased or increased dividends to stockholders be made possible.

The foreign trade future program seems to be taking form. Both President Eisenhower and Vice President Nixon have been talking of the need for increased foreign trade, the President to American audiences, and the Vice President in his good will visits to foreign lands. There is a mounting volume of petitions from domestic industry to the United States Tariff Commission seeking utilization of the escape clauses in various reciprocal trade agreements, to increase duty rates on commodities which are claimed to be coming into this market in dangerously increasing quantities. The action taken by the Commission and the manner in which the President accepts or rejects recommendations for such tariff rate increases, if any, will have a potent influence in determining the fate of legislation in Congress. It is being charged in many quarters that the Randall Commission for the study of international trade is overloaded with proponents of free trade, or quasi free trade, especially at the level of the presidential appointee segment of the Commission.

A fair prediction, however, is that there will be no final report from this Commission that will have a predominate trend in either the protectionist or free trade direction. The greater possibility is that any report will be accompanied by a strong minority report, regardless of the direction in which the majority report is slanted. A possible escape from this dilemma will be a report consisting of factual analyses, with no positive recommendation either way. Industries have been invited to present their views in writing, but there will be no public hearings. The American Tariff League has already filed a statement to the effect that the United States tariffs

are already the lowest in the world, except for a few comparatively minor industrial nations. The United Kingdom's rates, according to this analysis, are five times those of the United States, even though Britain is a traditionally free trade nation.

In the paper field, available August statistics show a total tonnage which was the largest for any August in industry history and the fourth best month on record. Production of printing papers was the highest for any month on record. Total production of paper and paperboard was only 2 per cent under the best previous record for the first eight months, and the output during the rest of the year may more than erase this differential.

Cold water

A dash of cold water has been tossed by Secretary Weeks at the proposals for the extensive use of bagasse for newsprint. In answering crticism by Senator Kefauver for the failure of his Department to send an expert to Cuba to help make newsprint from bagasse, Mr. Weeks said: "Although the Department of Commerce's report on bagasse, made last year, is favorable to the economic aspects of bagasse as a raw material for newsprint, based on laboratory tests, there is opinion among those who have experimented for years with this material that further technology must be developed before bagasse pulp can compete on a commercial basis with other fibers for newsprint." Mr. Weeks explained the failure to send an expert to Cuba, however, on the basis that the only available logical man to take up this task was already busy on a newsprint hardwood project which Senator Kefauver himself was pushing for completion elsewhere.

Financial Reports

The prospects of heavy demand for paper continuing into 1954 served to give paper mill securities an upward tendency. This tendency, at least in paper, appears to be more than a technical reaction from the previous depressed sentiment of Wall Street traders.

Net incomes

Canadian Chemical & Cellulose Co.—Net profit for the first six months of 1953 was $268,784, as against a net loss of $1,047,543 in the same period last year.

Central Fibre Products Co.—Net profit for the year ended June 27 was $3,124,302, compared with $2,962,055 last year.

Container Corp.—Net income for nine months ended September 30 was $7,589,000, as against $7,738,000 for the same period in 1952.

Eastern Corp.—Net income for six months ended June 30 was $400,476, as against $594,299 for the first six months of 1952.

Ex-Cell-O Corp.—Net income for nine months ended August 31 was $4,076,131, compared with $3,797,050 for the like period a year ago.

Federal Paper Board Co.—Net income for nine months ended September 30 was $1,410,617, as compared with $1,566,664 a year ago.

Fibreboard Products Inc.—Net income for six months ended June 30 was $5,135,270, compared with $5,093,613 for the similar months in 1952.

Flintkote Co.—Net profit for six months ended July 18 was $2,485,764, compared with $2,009,375 in 1952.

Fraser Cos. Ltd.—Consolidated net profit for the six months ended June 30 totaled $1,334,488, down 46.1 per cent from $2,478,626 in the same period last year.

Gaylord Container Corp.—Net income for the first six months of 1953 was $3,511,167, as compared with $3,602,473 for the like period in 1952.

Glatfelter Co. (P. H.)—Net profit for six months to June 30 was $573,715, compared with $379,838 for the same period in 1952.

Great Northern Paper Co.—Net earnings for the first half year were $2,372,047, as compared with $2,344,318 a year ago.

Hammermill Paper Co.—Net six months income was $659,070, as compared with $698,372 a year ago.

Hollingsworth & Whitney Co.—Net income for the first half of 1953 was $1,185,896, as compared with $1,480,108 in the corresponding period of 1952.

Hinde & Dauch Paper Co.—Net income for six months ended June was $1,790,661, as compared with $1,553,350 in 1952.

International Cellucotton Products Co.—Net income for the six months ended June 30 was $3,518,600, compared with $2,756,500 a year earlier.

International Paper Co.—Net income for the first half year was $28,586,166, as compared with $24,369,677 in the same portion of 1952.

Kalamazoo Vegetable Parchment Co.—Consolidated net earnings for nine months ended June 30 were $1,448,547, compared with $1,798,524 a year ago.

Keyes Fibre Co.—Net half year income was $518,570, as compared with $481,371 a year ago.

Kimberly-Clark Corp.—Net income for the year ended April 30 was $8,746,393, as compared with $11,305,913 in the previous fiscal year.

MacAndrews & Forbes Co.—Net income for nine months ended September 30 was $759,129, as compared with $769,460 a year ago.

Masonite Corp.—Net income for the year ended September 30 was $3,671,120, as compared with $3,368,203 in the previous fiscal year.

Mead Corp.—Net profit for the 24 weeks ended June 14 was $2,586,665, compared with a net of $2,322,313 in the like period in 1952.

Paper mill corporate changes

Anglo-Canadian Pulp & Paper Mills Ltd. has approved the issue of 215,000 shares of n.p.v. capital stock to gain control of Dryden Paper Ltd.; also, authorized an increase of Anglo-Cana-

dian's capital stock by the creation of 160,000 $2.80 cumulative redeemable sinking fund preferred shares, with approval to let the company issue all or part of these shares.

Dixie Cup Co. plans to raise about $7.6 million through an offering of new preferred stock to its common shareholders.

Great Northern Paper Co. has arranged to borrow up to $32,000,000 from a group of life insurance companies to finance the building of its new mill at East Millinocket, Me. Great Northern has already secured $15,000,000 of the loan and used $10,000,000 to repay its outstanding bank loans.

Lily-Tulip Cup Corp. has arranged to borrow $3,000,000 from Chase National Bank in installments from August 24, 1953, to July 1,1955. Under a revolving credit note plan, the firm will pay the prime commercial rate for 90-day maturities but not less than 3.25 per cent per year.

Maizewood Insulation Co. has been acquired by the Barrett Division of Allied Chemical & Dye Corp. The purchase is intended, according to Barrett officials, as a means of broadening its field of building and insulation products.

St. Regis Paper Co.'s 50,000-share secondary offering of common stock through Merrill Lynch, Pierce, Fenner & Beane was sold out quickly. The offering was priced at $18⅝ a share.

New York Stock Exchange—Stocks

	Closing Prices Oct. 20, 1953	Sept. 21, 1953
A.P.W. Products	* 2¾–3¼	* 2¾–3
Celotex	16¼	16⅝
Same Preferred	* 15⅝–16⅛	* 16⅛–16⅝
Certain-Teed Products	12	11⅝
Champion P.&F. Co.	31	28½
Same Preferred	100⅛	* 98–100
Chesapeake Corp.	* 27½–28¼	* 26¼–26⅝
Container Corp.	41⅜	37⅜
Same Preferred	99	* 99½–102
Continental Diamond	10½	* 9⅝–10
Crown Zellerbach	30⅜	28⅛
Same Preferred	99	94
Dixie Cup	37⅞	35⅞
Eastern Corp.	14⅞	14¼
Robert Gair	18⅜	17
Gaylord Container	22⅞	22
Hammermill	13	12⅝
International Paper	54½	49⅜
Same Preferred	*100⅛–102¾	* 95½–97
Kimberly-Clark	43⅜	40¼
Same Preferred	*101–103	* 98–105
MacAndrews & Forbes	42⅜	* 41¾–42⅛
Marathon	19⅜	17½
Masonite	18	16⅜
Mead Corp.	26¼	22¼
Same Preferred	* 85½–86½	* 85–86½
National Container	9¼	9¼
Same Preferred	19¼	19¼
Ravonier Inc.	25⅛	23⅛
Same Preferred	31¼	31⅜
Scott Paper	65⅜	61½
Same $3.40 Preferred	87	86½
Same $4 Preferred	*102½–104	*102–103
St. Regis Paper	20¼	17⅜
Same Preferred	* 93–93¾	91½
Sutherland Paper	29⅞	26½
Same Preferred	106	104
Union Bag & Paper	43⅝	38⅝
United Board & Carton	* 14–14⅛	13⅜
United Wallpaper	1⅜	1¼
Same Preferred	* 18½–19½	* 16⅛–17⅛
U.S. Gypsum	105	105½
Same Preferred	*170–173½	165
West Virginia P.&P.	85	78
Same Preferred	*104½–106	*103½–105½

New York Stock Exchange—Bonds

Celotex 3½%	.....	.....
Champion P.&F. Co. 3%	91⅛	.....
Mead Corp. 3%	.....	.....

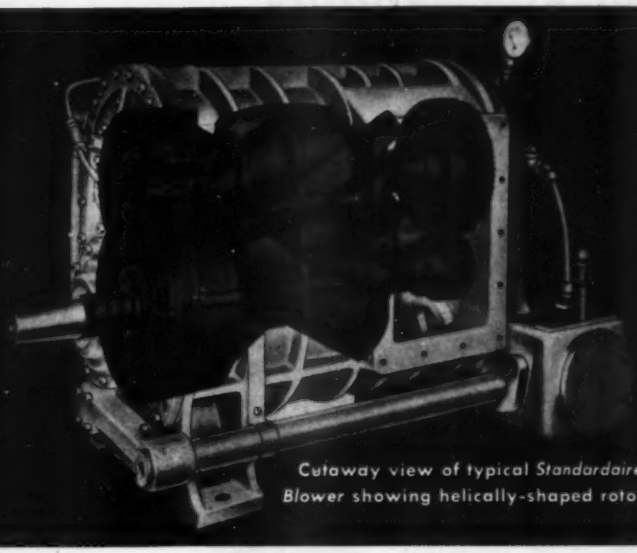
American Stock Exchange—Stocks

American Writing	12¼	11¼
Brown Co. Common	8⅝	7¾
Same $5 Preferred	.....	.....
Same $3 Preferred	.....	50
Great Northern Paper	52½	50
Puget Sound	30½	.....

* Closing Bid and Asked Prices..

Standardaire® Blowers

PUT A TIGHT SQUEEZE ON COMPRESSION COSTS



Cutaway view of typical *Standardaire Blower* showing helically-shaped rotors.

As the *Standardaire Blower's* unique helically-shaped rotors revolve, pockets are formed at the intake port which diminish in size as they approach the point of discharge. Within these pockets, air is compressed gradually and smoothly. The internal pressure is raised approximately to the discharge pressure before the pocket registers with the discharge port . . . reducing noise, shock, and loading of internal parts.

Since high pressure air is confined to the discharge end of the *Standardaire Blower*, leakage lines are much shorter than on other types of units. The rotors are accurately machined to very close running clearances and provide a continuous sealing for the entire length of their engagement. Their perimetral edges are sealed by the housing.

These are but a few of the unique features of *Standardaire Blowers* . . . which result in very high volumetric efficiency at lower installed cost, and lower maintenance and operating costs.

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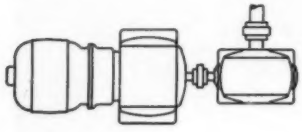
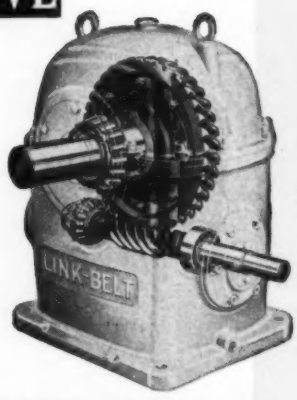
BLOWER-STOKER DIVISION
370 LEXINGTON AVENUE, NEW YORK 17, N.Y.

How to change even complex speed reduction problems into *simple* ones

WORM GEAR DRIVE

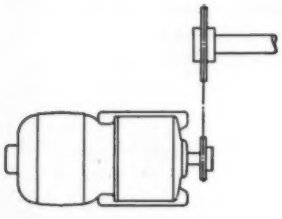
WORM GEAR and P.I.V. variable speed drives are shown direct-coupled. Link-Belt worm gear drives are available in 3.1:1 to 8000:1 reduction ratios—1400 to 123,000 in. lbs. torque—0.22 to 564 output shaft rpm. Ask for Book 2324A.

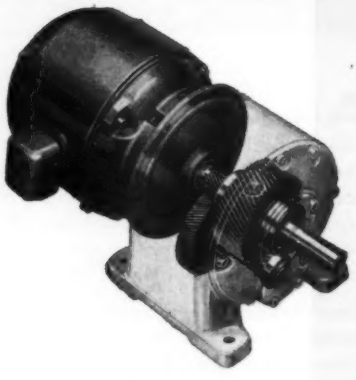




GEARMOTOR & HELICAL GEAR DRIVE

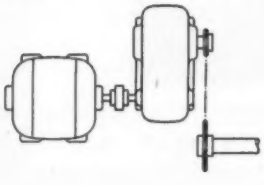
GEARMOTOR is shown with roller chain drive. Link-Belt Helical Gear Drives, Gearmotors and Motogears are available in 6.2:1 to 292:1 reduction ratios—1 to 30 hp—6 to 280 output shaft rpm. Ask for Books 2247 and 2451.

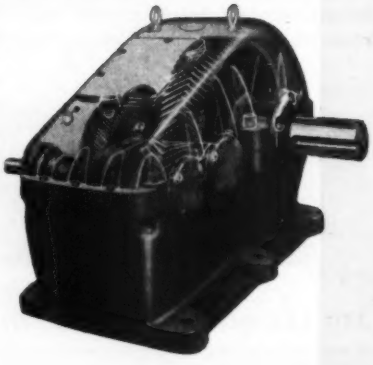




HERRINGBONE GEAR DRIVE

HERRINGBONE GEAR DRIVE is shown connected by flexible coupling to motor and with roller chain take-off. Link-Belt Herringbone Gear Drives are available in 2.84:1 to 326:1 ratios—0.4 to 2480 hp—2.2 to 623 output shaft rpm. Ask for Book 2519.





Get the proper drive combination that best meets your requirements from the broad LINK-BELT line

In addition to matching a wide range of requirements for ratio, hp, loading conditions and similar factors—Link-Belt enclosed gear drives offer you other benefits. When your Link-Belt representative selects a helical, herringbone or worm gear drive, you have no worries about coordinating it with your other components.

For Link-Belt builds a complete power transmission line. There's no need to exchange drawings with a third person to calculate chain, sprocket, coupling, bearing or even shafting requirements. You can get all these from one source . . . each pre-engineered for perfect fit.

Next time you're faced with a speed reduction problem, take it to power transmission headquarters. There's a Link-Belt sales office or distributor near you. Call today for complete engineering information.

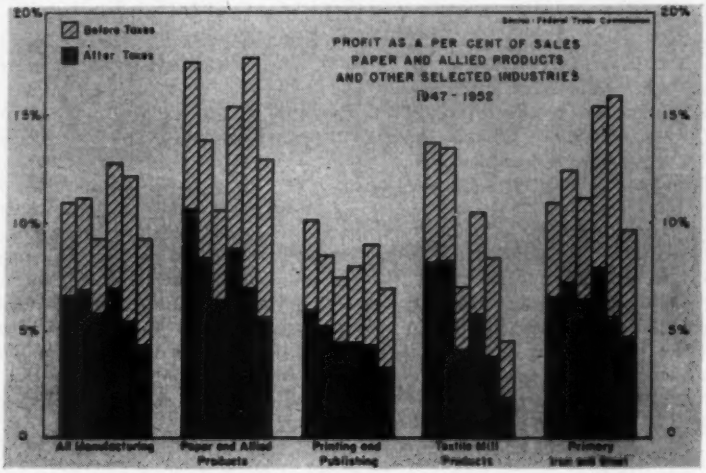
LINK-BELT

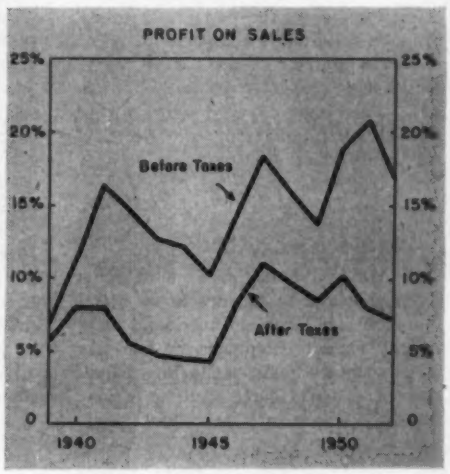
ENCLOSED GEAR DRIVES

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities.

19,128

News of the Industry





1952 High Sales Fail to Maintain Profit Levels, APPA Survey Shows

1952 SALES BY primary manufacturers of pulp, paper and paperboard are estimated to have been 7 billion dollars. Although this was only 3 per cent less than in 1951 and represented the second highest volume of sales ever achieved, a survey by the American Paper and Pulp Association has shown that the year was the least profitable experienced by the industry since World War II.

Sales in 1952 were high in terms of dollars, but the combined effect of inventory writedowns, price controls, increased costs, etc. was to reduce profits before taxes by 21 per cent. At the same time, the average margin of earnings on sales before taxes fell from 21.1 per cent in 1951 to 17.1 per cent in 1952. A big factor in the reductions was the inability—as industry operations dropped to 91 per cent of capacity—to fully benefit from the economies that accompany optimum utilization of production facilities.

The rate of profit on sales after taxes enjoyed by integrated producers was again more than twice that of the non-integrated firms, amounting to 8 per cent, while that of the latter group was 3.2 per cent. The rate of profit on sales after taxes was as follows: For integrated companies—about 17 per cent less than the average of 9.6 per cent for the period 1946-51; for the non-integrated companies, approximately 40 per cent less than their average of 5.5 per cent for the same period.

Although profits after taxes as a percentage of both sales and net worth were for the industry at their post-war low, average wages paid per ton continued to increase and in 1952 amounted to $32.90, approximately 50 per cent higher than in 1946.

The ratio of current assets to current liabilities in 1952 increased slightly from 2.3 to 2.7, and net working capital increased from 1.5 to 1.7 billion dollars. The long-term debt of the industry increased to about 1.1 billion dollars and was 20 per cent higher than in 1951. Current assets of 2.8 billion dollars were 32 per cent greater than the total of current liabilities and long-term indebtedness.

Relative earnings position

The inclusion of manufacturers of converted paper products in the Paper and Allied Products Industry Group as reported in studies of the Federal Trade Commission prevents the strict application of those data to the primary industry. Nevertheless, there is a close relationship between the profit data developed by the Commission and that collected by the APPA. For the purposes of comparing the relative earnings position of the industry, the study of the FTC serves a useful purpose.

These studies show that for the years 1947-52 manufacturers of paper and allied products have, with a high degree of consistency, shown a greater rate of profit after taxes per dollar of sales and on stockholders' equity than have most other manufacturing industries. In those years the return on sales for all manufacturing industries ranged from 4.3 per cent in 1952 to 7 per cent in 1948. The average for the period was 6 per cent.

For the paper industry, however, profits per dollar of sales have moved in the higher range of from 5.7 per cent in 1952 to 10.7 per cent in 1947 and have been maintained at an average of

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7.8 per cent. This average return on sales was exceeded by that of only four other industries—chemicals and allied products; petroleum refining; stone, clay and glass products, and the primary nonferrous metal industry.

A high return per dollar of sales in any industry having a low capital turnover does not, however, of necessity indicate an equally good return on stockholders' equity. For the period under discussion, when the paper and allied products industry is compared to other industries in this respect, it is found that it had an average profit of 15.1 per cent, while that of all manufacturing was 13.6 per cent. Only the electrical machinery group and the motor vehicles and parts group showed a higher average return.

Profits and utilization

Profitability in the paper industry is directly related to the degree to which mills are able to obtain maximum utilization of their equipment. While this is true for all mass production industries, it is particularly true for papermakers because of the high capital investment required and the fact that costs of production are commonly predicated on the assumption of 6- or 7-day per week operation. However, while the decrease in rate of operation may momentarily result in a somewhat greater proportionate decrease in the rate of profit, the industry's inherent stability is an important offsetting factor.

During the post-war years integrated mills have enjoyed a rate of profit on sales before taxes that has averaged about twice that of non-integrated mills. It appears, however, that on the basis of financial statements included in this survey the profit on sales in these two broad categories is a function of the skill and efficiency of management—rather than of the volume of sales or capital investment.

Events since 1939 have radically affected the relative profit positions of the integrated and non-integrated mills. In 1939, as a result of their relatively small capital investment and their ability to purchase primary raw materials at advantageous prices, the return on sales for non-integrated mills averaged slightly more than that for integrated mills. An additional factor that may have been to the advantage of non-integrated mills prior to 1940 was the flexibility of operations inherent in that type of mill.

As a result of the high demand for pulp and paper during World War II, the integrated mills were again able to fully utilize their equipment and earn an improved return on their capital investment; while non-integrated mills, although operating at a high level, were required to pay higher prices for raw materials. Consequently, the integrated mills were able to register the greatest gains.

In 1947, following the removal of wartime restrictions, the integrated mills were able to rapidly increase their return on sales, and as a group attained a rate not since equalled. The rate of profit on sales for non-integrated mills, however, did not respond to the same degree because the removal of controls was closely followed by rising raw material costs. Thus, it was not until 1950 that, again under conditions of high demand and a favorable cost-price relationship, these mills were able to raise their rate of return on sales.

TOP OF THE NEW digester building is a vantage point from which the Hurter-type chip bin, wood room, barking drums and wood yard can be seen

ENCLOSED RUBBER belt conveyor carries chips from bin to top of digester building

Latest Automatic Control at New Mead Pulp Mill; Capacity is 110 Tons

Extensive instrumentation and automatic control of the latest design are construction features of the new pulpmaking facilities at the Chillicothe (Ohio) Division of the Mead Corp. According to mill officials, pulp from the first blow in the new digester building was of fine quality; operation during the first several weeks indicated a high degree of uniformity.

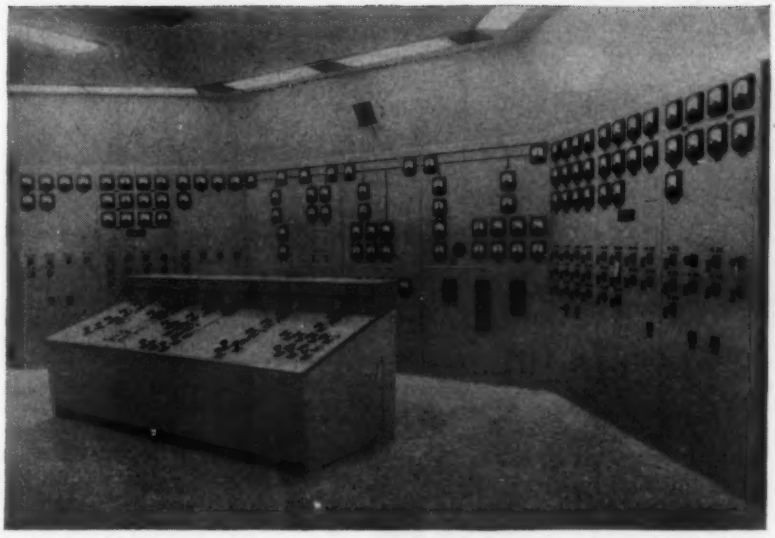
The new equipment is designed to add a daily 110 tons of air-dry soda pulp to the plant's output. It represents an important addition to the pulp capacity at Chillicothe and a further step toward integration. The installation includes a new wood yard, wood room, digester building, brown stock washing, screen room, causticizing plant, evaporator, recovery furnace and turbine.

Instrumentation and control

By means of the extensive instrumentation and automatic control systems a small number of men can operate the entire section of the mill consisting of the wood room, digesting and recovery equipment. Only four men per shift are required in the digester, brown stock washing and causticizing building.

The mill is designed to handle two kinds of wood. In addition to the wood mix of aspen, willow, cottonwood, yellow poplar, gum, etc., that had previously been used, the plant will handle oak. Cooks of each type of wood can be made simultaneously, or a mixture of the two types can be processed through the cooking process. By utilizing oak, Mead will be able to procure the increased quantities of wood needed for the added tonnage from near-by sources.

Engineering for the project was done by Mead's general engineering staff. Much of the construction work was by Chillicothe Realty Co., a Mead subsidiary.



ELECTRICAL CONTROL room is a vital part of distribution system

STEEL TOWERS encircle Powell River mill

New Electrical Distribution System Completes Powell River Project

Norman Walton

WITH THE INSTALLATION of a new electrical distribution system, Powell River Co. Ltd. has completed a major development program undertaken in 1948. At the same time, the Powell River, B.C., firm has solved one of its more troublesome problems.

Powell River's electrical system is unique in that it is completely self-contained and requires for its operation such miscellaneous services as snow surveys of its watersheds and fairly dexterous juggling of water levels in its two main storage systems. Another feature (standard throughout Europe) is the system frequency of 50 cycles rather than the 60 cycles common in North America.

The original electrical system installation—made in 1912—comprised two 550-volt, 2,000-hp. hydro units. The present system contains more than 100,000 hp in hydro and steam generation and handles an average plant load of 70,000 hp. In addition, about 25,000 hp is used in water-driven pulp grinders. This represents a load greater than that of the B. C. Power Commission's Campbell River hydro development that serves most of Vancouver Island.

In 1948 the power from the two hydro units at Stillwater was transmitted over a single circuit—a 13-mile 66,000-volt wood pole line to Powell River's No. 1 substation. From this point, a 6,600-volt tieline connected to another substation containing the four Powell River hydro units and an assortment of steam turbo generators—all at approximately 2,300 volts. Thus, 85 per cent of the mill distribution originated from this 2,300-volt substation.

On completion of the 1948 development program, it became apparent that the old mill electrical system was certain to be a bottleneck for any future expansions. It was overloaded and unprotected.

After many studies, a system was finally evolved that would correct the major troubles and do it economically. As reported by Norman Walton, project engineer, the scheme consisted of expanding the 6,600-volt bus bar of substation No. 1 through current-limiting reactors into a one-mile, 6,600-volt overhead ring encircling the mill. The sole function of the reactors is to limit the short circuit currents in all parts of the system to reasonable and safe values.

Four new substations were strategically located on the ring to distribute

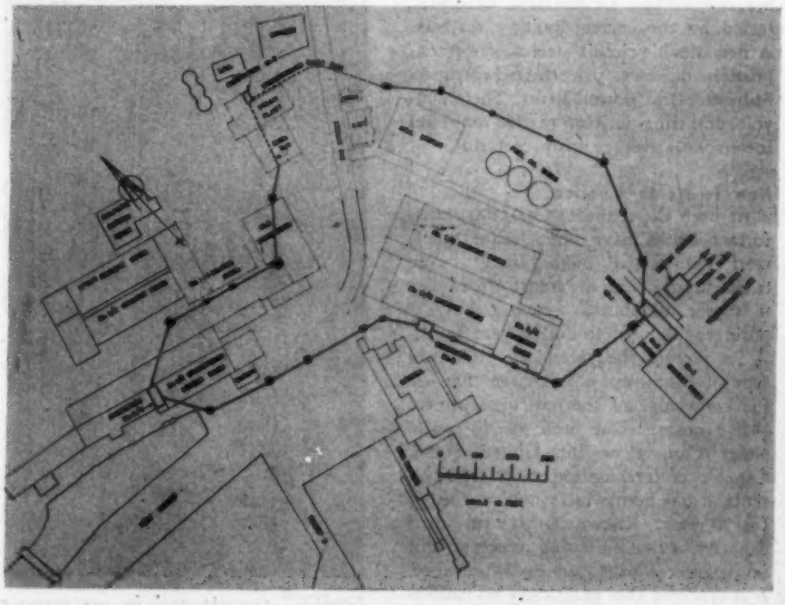
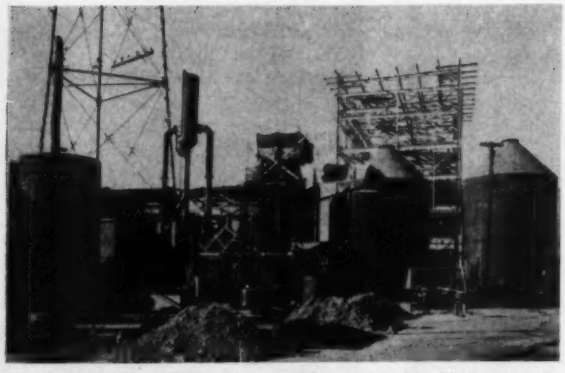
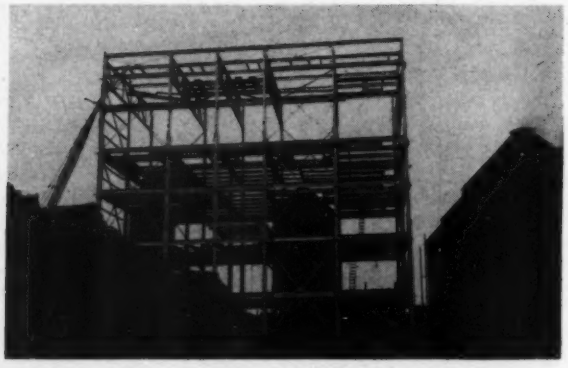


DIAGRAM OF NEW loop as designed and developed by PR engineers



BLEACH PLANT at Spring Grove is shown with the chlorine dioxide generating plant in the foreground



STEEL STRUCTURE for bleach plant; tanks within the framework are bleaching cells, those at right stock storage chests

secondary power at 2,300 volts. The basic principle involved: the approximate balancing of local generation and consumption at each substation so that normally only the equivalent of about 5,000 hp flows in the ring (about 50 per cent of the ring capacity).

From each substation the power is distributed at 2,300 volts for eventual 2,300- and 550-volt use in the various departments.

A test in miniature

To confirm design and specifications, the projected system was set up in miniature on the General Electric Co. network analyzer at Schenectady, N.Y. Simulated in the test were the transmission lines, the 6,600-volt ring, substation transformers, generators, and electrical loads. The studies included possible future expansion.

The Schenectady studies confirmed the design as being suitable for the needs of the Powell River operation. Overload conditions were eliminated. Existing breakers in No. 1 substation were protected by the current-limiting reactors. A new double-circuit steel tower transmission line was constructed between Stillwater and Powell River. The 6,600-volt mill ring is also carried on steel towers with average spans of 120 ft.

New to North America

At each department 2,300/500 transformer banks have been located. Formerly, almost all motor circuits were taken directly from the transformer buses to motor distribution centers, thus exposing equipment to full system faults.

To protect the secondary circuits a type of equipment was chosen that—to the knowledge of the mill management—had never before been put to use in either Canada or the United States. Capable of interrupting very large currents, it has been widely used in Europe for 20 years. Known as high-rupturing capacity, current-limiting fusegear, the units are compact and easily installed. It is reported that practically no maintenance is necessary.

Glatfelter Undertakes $3,800,000 Program for Mill Improvement

Conversion of the pulp mill from the soda to the sulfate process has been one of the first steps in the current $3,800,000 improvement program at P. H. Glatfelter Co., Spring Grove, Pa. Approval for the expenditure was granted in May at a special stockholders' meeting. Funds are being acquired through a $6,300,000 first mortgage loan with Mutual Life Insurance Co. of New York. (The sum includes provisions for additional working capital and for paying off the old mortgage.)

The change from soda to sulfate includes the addition of another digester, a new digester heat recovery system, a new liquor-making and causticizing system, and the installation of a Combustion Engineering spray-type recovery boiler.

Glatfelter's existing bleach plant will be augmented by a chlorine dioxide stage and a completely modern bleached stock storage system.

Taken into consideration in the firm's planning was air and stream pollution. For example, the new spray-type recovery boiler is to be equipped with a Koppers Co. Inc. electrostatic precipitator. The precipitation will remove 97½ per cent of the solids from the new boiler's exit gases. The chlorine dioxide bleaching stage will enable the company to improve the color of the water leaving the bleaching department—long a serious problem.

200-FOOT concrete stack for new recovery boiler

Land-Use Committee Named for Resources Conference

Membership of a steering committee on the use and development of the nation's rural lands has been announced by officials of the Mid-Century Conference on Resources for the Future. The meeting—to be held in Washington, D. C., December 2-4—will survey eight major natural resources areas.

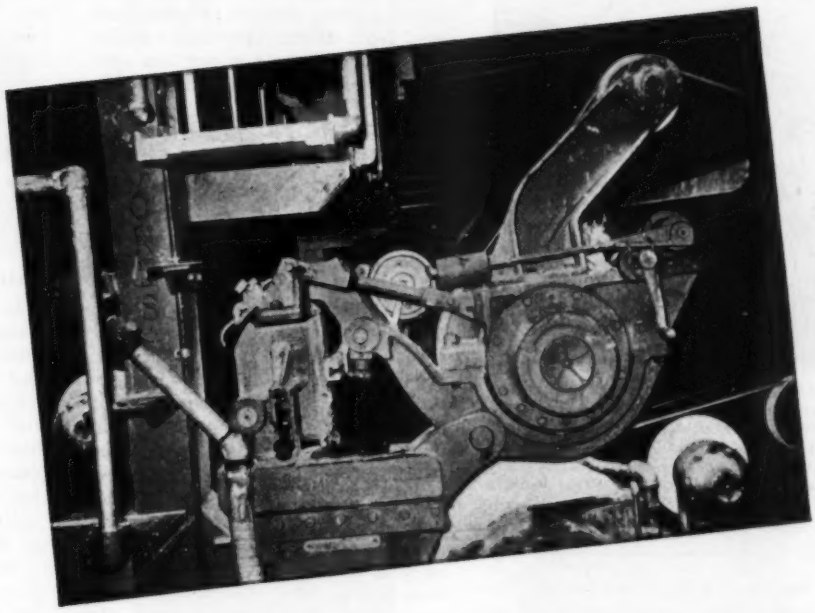
Lloyd E. Partain, sales manager for Curtis Publishing Co. and vice chairman of the committee on conservation of the National Association of Manufacturers, is chairman of the steering committee; co-chairman is Samuel T. Dana, dean emeritus of the School of Natural Resources, University of Michigan.

The section that they head will deal chiefly with methods of getting the most, over the long run, out of rural land devoted to agriculture, timber production, recreation and other uses.

The Conference is being conducted by Resources for the Future Inc., a nonprofit corporation organized last year to foster education and research in natural resources. Financial aid is being made available through a grant from the Ford Foundation.

Committee members in addition to

Actual installation of new Puseyjones Watermarking Attachment on upper press roll.



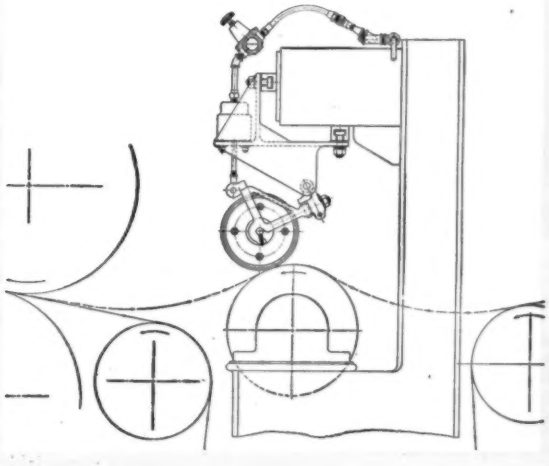
Modernize with New Puseyjones Watermarking Attachment

If you are using cumbersome, spring-loaded watermarking units, here is important news for you. Puseyjones has developed a new Watermarking Attachment with controlled air-loading for each marking unit. Mill-tested, mill-proved for superior, uniform watermarkings across the sheet. Installed in the press section, either directly on the upper press roll or on the run of the sheet between the presses.

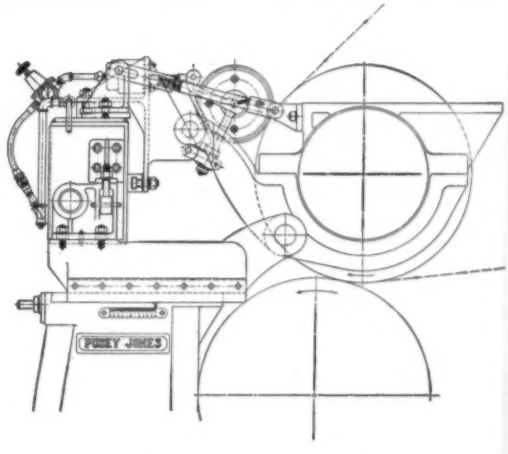
In this new attachment, the drums are made with demountable rims, having marking bands molded thereto. Rubber marking bands easily replaced when changing watermarks. Present marking bands may also be used with this attachment. Write today or call our District Representative near you.

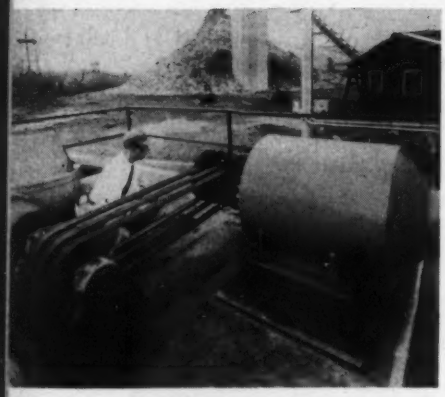
THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Fabricators and Welders of all classes of Steel and Alloy Products
Wilmington 99, Delaware, U.S.A.

Typical installation between the presses.



Typical installation on upper press roll.





PROPELLER-TYPE pump, 60 hp motor and Texrope drive with automatic Vari-Pitch sheave that have been installed by West Virginia Pulp & Paper Co. at Covington, Va., to provide additional water flow to a pulpwood log flume; the Allis-Chalmers Mfg. Co. drive provides the required variable speed to regulate the flow

Mr. Partain and Mr. Dana are: Benton R. Cancell, vice president in charge of operations for Rhinelander Paper Co., Rhinelander, Wis.; Harold G. Wilm, associate dean of the College of Forestry, State University of New York, Syracuse; Murray Benedict of Berkeley, Cal., professor of agricultural economics at the University of California; Waters Davis of League City, Texas, president of the National Association of Soil Conservation Districts; George W. Dean of Charlottesville, Va., Virginia State Forester and president of the Association of State Foresters; Paul A. Herbert of East Lansing, Mich., director of the Division of Conservation of Michigan State College, and R. C. Jacobson of Minneapolis, secretary-treasurer of the Minnesota State CIO Council.

John Strange to Build $75,000 Power Plant

The John Strange Paper Co. will build a $75,000 power plant building at its plant in Menasha, Wis. The 60- by 100-ft. building will be of masonry construction.

The current project is the first step in the final phase of an expansion and modernization program that was launched in 1941. The long-range program will be culminated by the end of 1954 with the installation of a high-pressure, high-temperature boiler and a turbo-generator of 7,500 KVA capacity.

Between 1941 and 1946 the firm added dryers on two paper machines. Following a disastrous fire in 1944 that destroyed offices and storage facilities, the company devoted its efforts to rebuilding. By 1946 modern fireproof buildings for manufacturing operations, storage of raw materials, and office space had been completed.

Since that time, a cleaning system for removing heavy particles of foreign material from diluted fibers has been installed. In 1952 the firm put into operation a new asphalt dispensing system.

Pennsylvania Firm to Utilize Hardwoods in New Pulp Plant

A new semichemical pulp pilot plant has been completed at Lock Haven, Pa., for New York & Pennsylvania Co. Rust Engineering Co. of Pittsburgh designed and built the plant.

The new facility was designed to make use of Pennsylvania hardwoods in the production of pulps for the firm's high-grade papers. The pilot plant can also utilize local softwoods.

The project included design and construction of a two-story concrete and cement block building, as well as a wood handling system, pulp mill and bleach plant. While experimental in nature, pulp production at the new mill can be integrated with New York & Pennsylvania's other units at Lock Haven. The latter consist of two paper mills and a pulp mill.

Whiting & Co. Sold

Whiting & Co. Inc. of Holyoke, Mass., has been sold to two members of the concern and a local business man. The announcement was made by Edward C. Whiting, president and treasurer.

The new owners are Charles Davidson Jr., vice president and general manager; J. Wesley Saw Jr., sales manager, and Robert Belsky, president of Paper Mill Supply Co., also of Holyoke. Mr. Davidson and Mr. Saw will continue in their present posts, and Mr. Belsky will have charge of real estate. Mr. Whiting is to serve as board chairman.

Whiting & Co. was organized in 1928. It is not affiliated with Whiting Paper Co., which owns and operates two other mills in Holyoke.

ACID-PROOF suit designed to protect workers from contact with sulfuric acid at the pulp division of Weyerhaeuser Timber Co. in Everett, Wash.; all parts of the apparel are marked with pink paint to prevent the suits from being used in any other area of the plant; they are stored near the acid-making equipment in special lockers, each of which also contains a jug of mild alkaline solution for use in neutralizing acid on the skin; modeling the suit is Roy Chaney, a Weyerhaeuser employee

Business Good: Robertson

R. B. Robertson Jr., president of The Champion Paper & Fibre Co., in a recent letter to the firm's employees declared that current business is good, and that the paper industry is an excellent barometer of business activity in the United States. He added that there is a heavy demand for Champion's products, which has been reflected this year by the absence of a summer slump similar to that of 1952.

Mr. Robertson declared that the company's faith in the future is shown in the $9,500,000 expansion and modernization program launched in the current fiscal year and planned for completion in March 1954. This is $1,000,000 more than was spent in fiscal 1953.

Marathon Foundation Incorporated

Articles of incorporation for Marathon Foundation Inc. of Menasha, Wis., have been filed. Incorporators are D. C. Everest, Marathon chairman of the board; John Stevens Jr., president, and Carl R. Geisler, personnel manager. The corporation will have no capital stock, and no dividends or profits will be paid.

Purpose of the foundation is to raise and invest funds, the principal of which will be used for charitable, religious, scientific, literary and educational purposes.

Monadnock, Permachem Sign Pact for Germ-Free Process

Permachem Corp. of New York, N. Y., and Monadnock Paper Co. have signed an agreement whereby the Bennington, N. H., firm will use Permachem's germ-free process in treating all paper products. The announcement was made by Cecil P. Young, president of Permachem, and Gilbert Verney, president of Monadnock.

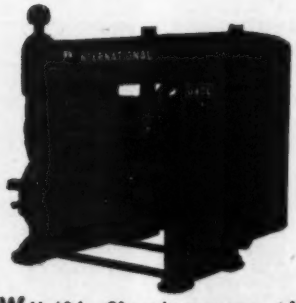
Permachem is a patented product and process that has required more than 15 years of chemical research and development. Tests made by independent laboratories indicate that materials that have been processed kill or inhibit a wider range of disease-producing bacteria, fungi and molds than the so-called "Wonder Drugs."

Paper treated in the laboratory thus far has not been changed appreciably in

NEW, Power-Packed AND READY TO GO!

NEW U-1091 natural gas power unit develops 187 net h.p. at 1400 rated r.p.m.; 200 net h.p. at 1600 max. r.p.m.; maximum torque, 820 lbs. ft. @ 800 r.p.m.

NEW U-450—102 net horsepower at 1800 rated r.p.m.; 110 @ 2200 r.p.m.; maximum torque, 324 lbs. ft. @ 1200 r.p.m.



NEW U-406—91 net horsepower at 1800 rated r.p.m.; 98 @ 2200 r.p.m.; maximum torque, 279 lbs. ft. @ 1200 r.p.m.

NEW U-372—83 net horsepower at 1800 rated r.p.m.; 91.5 @ 2200 r.p.m.; maximum torque, 263 lbs. ft. @ 1200 r.p.m.

NEW U-269—62 net horsepower at 1800 rated r.p.m.; 72 @ 2400 r.p.m.; maximum torque, 191 lbs. ft. @ 1200 r.p.m.

NEW U-240—55 net horsepower at 1800 rated r.p.m.; 64 @ 2400 r.p.m.; maximum torque, 168 lbs. ft. @ 1200 r.p.m.

NEW U-220—50.5 net horsepower at 1800 rated r.p.m; 62 @ 2400 r.p.m.; maximum torque, 151 lbs. ft. @ 1200 r.p.m.

IH Announces Seven New International Engines

Seven new six-cylinder, carbureted, valve-in-head engines have been added to the International line, which now includes 18 models—diesel, gasoline or gas—ranging from 16.5 to 200 net horsepower.

These new models are the result of more than 45 years of IH engineering and manufacturing experience building a complete line of heavy duty engines for tractors, trucks, construction and oil field equipment and individual power unit applications.

These new units have the durability, flexibility and economy to meet your requirements for lower cost performance. The unmatched network of IH district offices, parts depots, distributors and dealers puts complete service facilities practically at your door.

If you are an individual user of engines, it will pay you to see your nearest International Industrial Distributor or Power Unit Dealer for more complete information. If you are a manufacturer, your nearest IH district office will be glad to help you engineer these engines into the equipment you are building.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

POWER THAT PAYS — **INTERNATIONAL**

appearance or strength. It is odorless and has been found to be non-toxic to human beings.

Permachem chemists and technical engineers are serving as consultants at Monadnock, where the process is being adapted to high-speed production methods.

Expansion Notes

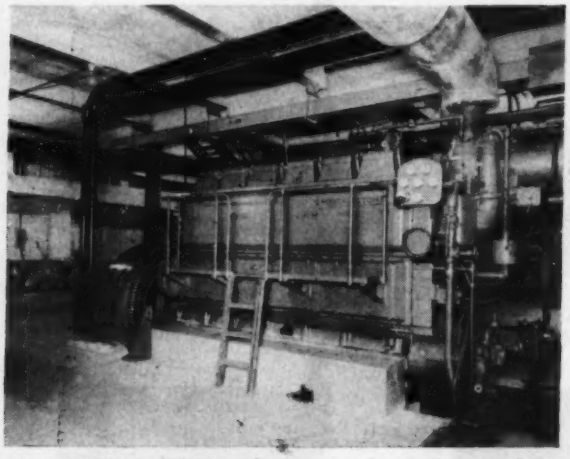
Union Bag & Paper Corp.
at Savannah, Ga., has broken ground for a combination manufacturing and warehouse unit. It is expected that the structure—290 ft. wide and 1,296 ft. long—will be completed by May of 1954. A special feature of construction will be the use of Georgian white marble chips as insulation material on the roof of the manufacturing portion.

St. Regis Paper Co.
has been reported to have long-range plans for the construction of five complete papermaking units at Eastport, Fla. According to Tax Assessor Leon E. Forbes of Jacksonville, who made the announcement, the total investment will approximate $50,000,000. A St. Regis official when asked about the possibility would neither affirm nor deny it but admitted that the firm has plans in mind for expansion.

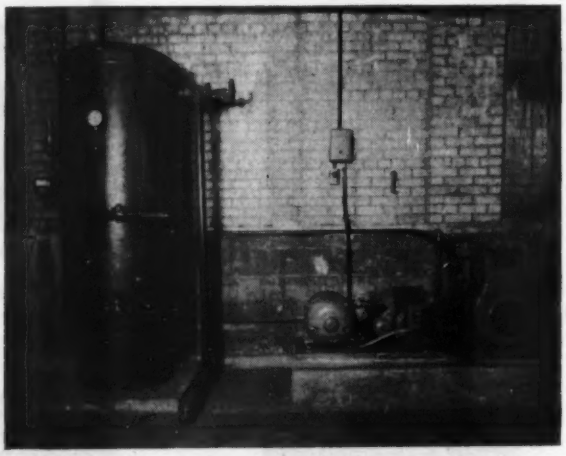
Green Bay Box Co.
has started construction of a $30,000 addition to its plant. Of one-story design, the building will measure 75 by 135 ft.

West Virginia Pulp & Paper Co.
has recently acquired title to more than 136,000 acres of timberland in North Carolina. The purchase price averaged $5.50 per acre.

American Paper Products Co.,
Philadelphia, has started construction of a $125,000 building on land adjacent to the site of its present paper mill operations in Waltham, Mass.



865-HP DIESEL by Worthington Corp. is sole standby unit of the Kalamazoo Paper Co. mill; the unit starts steam plant auxiliaries in emergency, runs fire pump, and turns mill equipment for week-end maintenance



STARTING AIR for the diesel is provided by a V-type Worthington compressor that can be driven either by an electric motor or a gasoline engine; air tank at left is kept at 250 psi so that air is always available

Kalamazoo Paper Installs Diesel for Standby Power

A heavy-duty prime mover has been put into operation at Kalamazoo Paper Co. to combat against power shutdown in case of emergency. The unit is a 865-hp Worthington Corp. diesel.

The firm, one of the nation's major producers of book and coated papers, reuses its papermaking steam in the production of power. Consequently, Kalamazoo uses steam turbines to provide electricity. In all, there are eight turbines with a combined capacity of 20,000 kw.

All steam plant pumps and boiler fans are electrically driven, and the entire plant would be dead if the turbines stopped. Some other source of power would be essential for a start-up. It was considered necessary, too, to have an alternate source of power capable of running motor-driven fire pumps. Finally, it is customary on Sundays to do maintenance work on the paper machines and other mill equipment. Mill management considered the convenience of having a power source that can be called into service to run one of the big machines as needed.

The engine chosen is a six-cylinder, four-cycle Worthington diesel with exhaust-driven Elliott-Buchi turbocharger, rated at 865 bhp at 600 rpm. It drives a 600-kw, three-phase, 60-cycle, 480-volt Electric Machinery Mfg. Co. synchronous generator with a 7.5-kw., 125-volt V-belted exciter.

Can power largest equipment

In emergency, if the turbines are down, the diesel is said to be capable of handling the water pumps, boiler draft fans, and fire pumps. If called on to assist in plant maintenance, the engine can power the largest piece of machinery in the mill. Whether needed or not, the unit is operated once a week to insure against emergency.

Engine cooling is fully automatic. Jacket water is circulated through the engine and a shell-and-tube heat exchanger by a 2.5-in. centrifugal pump driven by a 7.5-hp motor. A Fulton-Sylphon thermostatic control maintains jacket temperature at the desired level by bypassing water around the exchanger. For makeup, a float-controlled valve in the surge tank admits distilled water from the boiler condensate supply as needed. The main pumps that provide filtered river water for the mill send raw water through the engine's Sims Co. heat exchanger and lube oil cooler.

A detergent-type Texaco Ursa P40 lubricating oil is used, pumped to the bearings by an engine-driven pump. Intake air is drawn through an Air-Maze oil-bath filter inside the building to the turbocharger. Exhaust gases drive the turbocharger and then vent through a vertical Maxim silencer in a room adjoining the engine room.

Alarm system

Installed on the diesel unit is a James P. Marsh gauge panel with a multi-point Alnor, Illinois Testing Laboratories Inc., pyrometer and pressure gauges on fuel, lube, water, starting air, turbo lube, and tubo air. A Viking alarm system warns in event of high jacket water temperature, low lube pressure, or low jacket water pressure.

Since the engine would be needed most urgently if no electricity were available, the starting air compressor is provided with alternate drives—a gasoline engine in addition to the usual electric motor.

$2,000,000 SULFITE liquor evaporation plant at Northern in Green Bay required three years to build; it puts the firm in full compliance with orders issued by the State Committee on Water Pollution

VIRTUALLY the entire operation of the evaporation process is automatically governed by instruments in this control panel; lower section of one heat exchanger can be seen in upper left corner

World's Largest Anti-pollution Evaporator Started by Northern

WISCONSIN EARNED TWO new world's records in the campaign for cleaning up industrial streams September 29 when Northern Paper Mills started up its new $2,000,000 plant for evaporating and burning spent sulfite liquor.

Milan Boex, company president, put the massive stainless steel equipment into operation during a simple ceremony staged in the huge evaporator building, which is located adjacent to Northern's 140-ton sulfite pulp mill at Green Bay. Opening a valve to allow the liquor to flow to the evaporators, Mr. Boex declared that, "We are putting to work the world's largest evaporator devoted to stream improvement. Also, when the clean-up we are starting at this instant is added to advances already made by mills further upstream, the Fox River, along with Green Bay, climbs to top place as the major body of water that has been most completely cleared of sulfite pollution anywhere in the world."

Northern, a subsidiary of Marathon Corp., planned a short shake-down period under the close supervision of H. W. Gochnauer, chief engineer, and N. L. Malcove, technical superintendent, who had much of the responsibility for carrying the project through. Regular operation of the equipment is to be under the direction of R. G. Smith, pulp mill superintendent.

Third Wisconsin installation

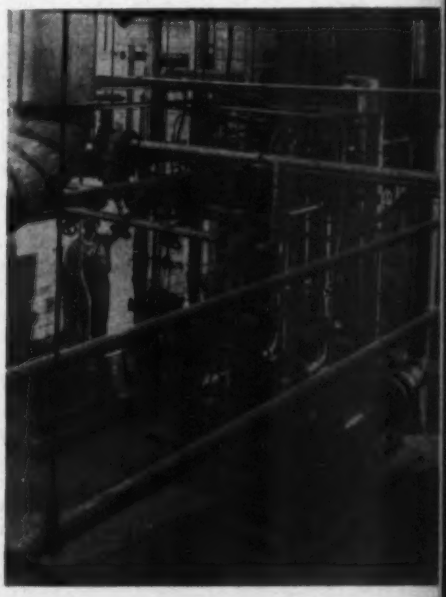
Installation of the Rosenblad reversible flow quadruple-effect evaporators marked the third installation in the state and the largest to date. Northern expects through use of this equipment to attain a major reduction in its biological oxygen demand discharged to the river.

The mill's entire supply of collectible liquor will be processed through this plant, entering the system at approximately 10-12 per cent oxygen content and emerging from the fourth effect at

ABOVE: Milan Boex, Northern president, opens valve to start operations; others (l to r): V. J. Muench of Izaak Walton League; T. F. Wisniewski of state pollution body; A. F. Sidlow, Green Bay smoke inspector, and Allen Abrams, research vice president of Marathon

LEFT: Three vapor bodies at Northern's sulfite liquor evaporating plant

RIGHT: Maze of piping at base of the concentrator section



52 per cent solids content. The 52 per cent liquor is then passed through a plate type Rosenblad concentrator with forced circulation to bring it up to 65 per cent solids content for atomizing with steam and burning with powdered coal in two boilers recently converted for this purpose.

Northern has in recent months equipped two furnaces for burning the evaporator plant's full output of sulfite concentrate, and by the addition of a Riley Stoker Co. boiler of 135,000-lb. hourly steam capacity has provided the extra steam required to operate the evaporator plant. Used in this way, the sulfite concentrate can replace a considerable tonnage of the mill's previous coal consumption, although at a somewhat higher cost per heat unit produced.

Spent sulfite liquor is collected from the mill's four vertical digesters and pumped to a 10,000-gal. padding tank, the fiber is removed in a rotary screen, and the liquor then flows to a 100,000-gal. storage tank. From here, it is pumped to the evaporator plant.

Master panelboard

Principal units of the plant are five vapor bodies and four rising film plate type heaters with natural circulation. Both the vapor bodies and heaters are products of General American Transportation Co. The liquor flows into the third effect and then successively to the fourth, first, and second effects. From the second effect it is pumped to a holding tank and then to the concentrator. The heaters have a total of 20,810 sq. ft. liquor-heating surfaces, and the concentrator has a heating surface of 500 sq. ft. Heaters are interconnected with the five vapor bodies. The fifth vapor body is necessary for alternating liquor and vapor phases periodically to eliminate scale. Piping and auxiliary equipment are so arranged that they also can be alternated between liquor and condensate. This is so scale can be dissolved by the condensate. The evaporators are designed to operate at 25 psig and 26 in. of vacuum in the fourth effect. The entire installation is of type 316 stainless steel.

The evaporating plant is operated altogether from a master panelboard that controls levels and flows from each phase of the operation. The switching operation of the entire unit is done simultaneously with hand controls. Switchgear is by General Electric Co.

The evaporators are designed to handle a feed of 126,250 lb. per hour at 10 per cent solids and 175° F. and produce a product of 19,450 lb. per hour at 65 per cent solids and 211° F. The plant is designed over-sized by 25 per cent for future contingencies. The economy of the plant is designed to evaporate 3.45 lb. of water per lb. of steam. The system includes an American Heat Reclaiming Corp. spiral heat exchanger in the liquor path between the fourth and first effects to extract the heat from the condensate. The condenser water required is 2,700 gpm at maximum temperature 85° F. The plant removes by evaporation 106,800 lb. of water per hour. Thus, the operation removes by evaporation 5.5 lb. of water to produce 1 lb. of the 65 per cent concentrate.

2½-year project

The big job was completed in barely 2½ years from blueprints to start-up despite major obstacles. In dedicating the plant, Mr. Boex declared that, "We were doggedly determined to get the plant operating at the earliest possible moment to comply with state orders to reduce pollution, and we spared no effort to reach our goal."

Additional equipment

Equipment sources in addition to those already listed are as follows: *Pumps*—Worthington Corp.; *Piping*—Chicago Tube & Iron Co., Alloy Crafts Co., Taylor Forge & Pipe Works; *Valves*—Crane Co., the Cooper Alloy Foundry Co.; *Structural Steel*—Joseph T. Ryerson & Son Inc.; United States Steel Supply Co., Northern Boiler & Structural Iron Works; *Instruments*—Minneapolis-Honeywell Regulator Co., Fisher Governor Co.; *Tanks*—Kalamazoo Tank & Silo Co., Superior Tank & Fabricating Co.; *Electrical Equipment*—General Electric Co., Marathon Electric Mfg. Corp., Cutler-Hammer Inc.; *Condenser*—Ingersoll-Rand Co.; *Atomizing Spray Nozzles*—Engineer Co., National Airoil Burner Co.; *Fans and Dust Collector*—American Blower Corp.; *Insulation*—Bay Asbestos, and *Temperature Recorder*—the Foxboro Co.

Sec. McKay Praises Private Forestry at U. of M. Anniversary Convocation

"MAINE SETS A FINE example of private forestry in operation" and should serve as a model for other states in the preservation of their woodland resources.

This was the view expressed by Secretary of the Interior Douglas McKay as he addressed a general convocation at the University of Maine October 2. The assembly was one of the highlights of a three-day program marking the 50th anniversary of the founding of the university's Forestry Department and the 40th anniversary of the establishment of its pulp and paper courses.

Secretary McKay assured his audience that, while the federal government has "a very active interest in promoting and encouraging sound resources conservation and development, it has no desire to dominate the work. . . . In its proper sphere, the federal government will endeavor to be a constructive participating member in a genuine joint effort with states, localities, and private interests."

During the convocation, the university conferred the honorary degree of doctor of laws on Secretary McKay. Others receiving honorary degrees, all prominent in forestry or pulp and paper circles, were Hugh J. Chisholm, president of Oxford Paper Co.; Dwight B. Demeritt, manager of woodlands for Dead River Co.; Louis J. Freedman, manager of woodlands for Penobscot Chemical Fibre Co., and J. L. Ober, vice president of Scott Paper Co.

Recipients of the honorary degrees were presented by Raymond W. Davis, president of the university's board of trustees; the citations were read by Dr. Arthur A. Hauck, president of the school.

No usurpation

"While we are happy to cooperate," Secretary McKay continued, "I am determined that the federal government will not usurp any of the prerogatives nor undertake any of the duties that are of a strictly state or local nature.

"Unfortunately, it has become the custom in some areas—although not in Maine—to look to the federal government to do many of the things that state and local governments should do themselves.

"As a result, the costs of the federal government have risen to the point where income no longer balances outgo. If it were my own business, I would be most concerned because such a situation eventually means bankruptcy. As Secretary of the Interior, I am equally concerned and know we must narrow the gap between federal receipts and expenditures."

Whittemore speaks

Reports on the activities of the University of Maine Pulp and Paper Foundation were presented during the anniversary celebration. And following a visit to the U. of M. engineering laboratories and a luncheon on the campus, the pulp and paper group gathered for a gala banquet at the Lucerne Inn. Speaker for the occasion was Laurence F. Whittemore, president of Brown Co.

Ralph H. McKee, New York, N.Y., consulting engineer, opened the program of the Pulp and Paper Foundation's third open house with a discussion of the topic, "The Inception of Pulp and Paper Instruction at the University of Maine." Philip S. Bolton, research di-

"STOCK-MAKERS" ARE TODAY TREATING:

RAG
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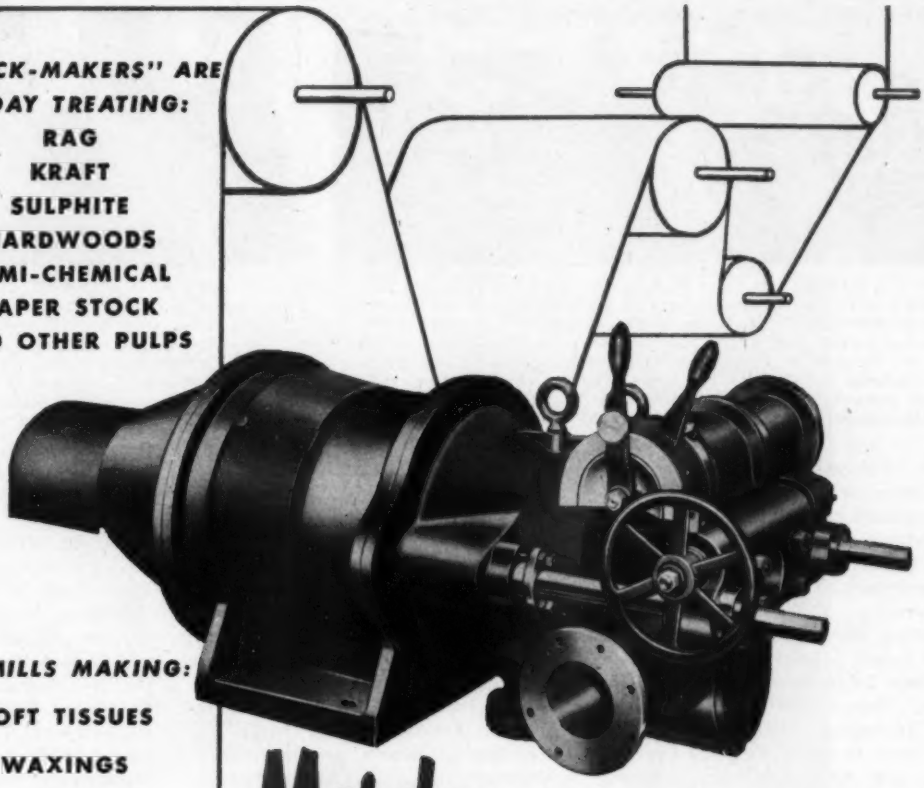
HARDWOODS
SEMI-CHEMICAL
PAPER STOCK
AND OTHER PULPS



IN MILLS MAKING:

SOFT TISSUES
WAXINGS
BOOK
BONDS
BOARDS
WRITINGS
WRAPPINGS
BAG
COATED
CARBONIZING
GLASSINE
AND OTHER GRADES

Morden "STOCK-MAKER" BEATS THEM ALL CONTINUOUSLY...

Direct from chest to chest or from chest to paper machine without batching or cycling.

The "Stock-Maker" gives the utmost efficiency in beating treatment — at one-half the power, in one-third the space, with none of the labor required by the ordinary conventional roll type beater.

The 700 "Stock-Maker" installations in 180 paper mills in 23 countries throughout the world prove that—

For quality and economy, it will pay you well to Mordenize your beating with "Stock-Makers".

MORDEN
STOCK PREPARATION EQUIPMENT
MACHINES COMPANY

For complete information write
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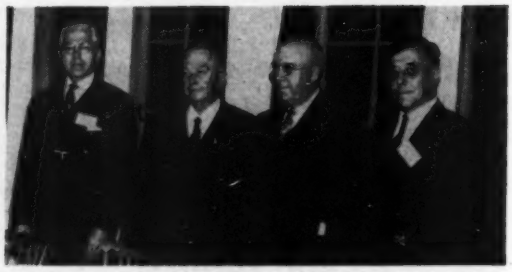
Corbett Building, Portland, Oregon

SPEAKERS DURING THE U. of M. Pulp and Paper Foundation program included (l to r): Lyle C. Jenness, head of the Department of Chemical Engineering; Ashley S. Campbell, dean of the College of Technology; Ralph A. Wilkins, vice president of the Paper Products and Felt Division of Bird & Son inc.; Theodore W. Prescott, assistant advertising manager of Scott Paper Co.; Frederick A. Soderberg, vice president of F. C. Huyck & Sons; Philip S. Bolton, research director of Robert Gair Co., Inc.; T. G. Mangan, manager for International Paper Co., and Ralph H. McKee, consulting engineer



HEAD TABLE GUESTS at the U. of M. Pulp and Paper Banquet were (l to r): J. L. Ober, vice president of Scott Paper Co. and president of the Pulp and Paper Foundation; Hugh J. Chisholm, president of Oxford Paper Co., Rumford, Maine; Laurence F. Whittemore, president of Brown Co., Berlin, N.H., and Arthur A. Hauck, president of the University of Maine; the dinner at the Lucerne Inn was part of the celebration of the 40th anniversary of the pulp and paper curriculum

rector for Robert Gair Co. Inc., described the origin of the five-year operational management curriculum. "Present Day Instruction and Research" was the title of a paper by Lyle C. Jenness, head of the university's Department of Chemical Engineering.

Among other speakers at the meeting were Robert J. Seidl of the U.S. Forest Products Laboratory, who spoke on the topic, "Research in Wood Utilization and Technology," and W. S. Bromley, executive secretary of the American Pulpwood Association, who discussed "Research in Woods Operations and Equipment."

Annual lecture series

A series of 16 lectures by specialists in the pulp and paper industry is being presented at the University of Maine during the fall semester. This is the sixth year in which this industrial lecture program has been made available. Prof. Lyle C. Jenness of the Department of Chemical Engineering is in charge.

Remaining lectures are as follows: November 19—"Alkaline Pulping, Chemical and Heat Recovery," The Babcock & Wilcox Co.; December 3—"Semichemical Pulping," T. W. Small Jr., Sprout, Waldron & Co. Inc.; December 17—"Bleaching—Chlorine," A. A. Mann, S. D. Warren Co.; January 7—"Bleaching, Peroxide and Other," J. S. Reichert, Electrochemicals Department, E. I. duPont De Nemours & Co.; January 14—"Corrosion in Pulp Mills," E. W. Hopper, Crucible Steel Co. of America, and January 21—"Stream Improvement," H. W. Gehm, National Council for Stream Improvement.

Marathon Expands in New York

Further expansion at the plant of Marathon Corp. of New York Inc., Oswego, has been announced by John Stevens Jr., president of Marathon Corp., the parent concern. The New York property was purchased by Marathon from St. Regis Paper Co. under contract in 1951 and delivered last July 1.

"Work is being continued at the Oswego mill to further expand our converting operations, utilizing the paper and board manufactured at the Oswego plant into our end products for sale to our food packaging customers," Mr. Stevens said. The Marathon president also predicted continued high-level sales volume for the firm, with "booking and backlog of orders giving us assurance of high-level production as we approach the end of our fiscal year."

Hydraulic Wedge Makes Timber Harvesting Easier

The U. S. Forest Service is testing a 3-ft. hydraulic wedge developed by Ronald Chrisman of El Segundo, Cal. It is said that the gadget fells "giant trees with a few twists of the wrist."

An axe is not needed when the wedge and a chain saw are used together. The saw makes an undercut on the trunk in the direction of the fall; then it makes another on the opposite side. The wedge is inserted in the second cut, and a few pumps on the handle drive the wedge in and the tree topples.

The device was recently put into production by Hufford Machine Works of El Segundo. Spokesmen for the firm say it has these advantages: (1) It eliminates the use of wooden and steel wedges and—naturally—the packing and swinging of sledges; (2) it is easily portable and is carried in a sling over the shoulder; (3) it makes the task of guiding the fall of a tree simpler, and (4) it eliminates the shock of sledge hammer blows, which sometimes cause heavy branches to break from the tree tops, endangering the men at work below.

Wellington Fund Boosts Holdings in Paper Firms

The $252,000,000 Wellington Fund of Philadelphia was a purchaser on balance of paper and timber stocks in the first six months of 1953, according to the organization's semi-annual report.

The Fund, one of the largest mutual investment companies in the country, purchased 13,800 shares of Crown Zellerbach Corp.; 7,000 shares of Rayonier Inc., and 5,000 shares of Scott Paper Co. Holdings of Union Bag & Paper Corp. were reduced.

Seven paper and timber firms were listed in the Wellington portfolio as of June 30. These include: Scott Paper (23,000 shares); Crown Zellerbach (29,800 shares); International Paper Co. (14,000 shares); Rayonier (25,000 shares); Union Bag & Paper (15,000 shares); Marathon Corp. (30,000 shares), and Weyerhaeuser Timber Co. (10,000 shares). The holdings had a market value of $5,351,775.

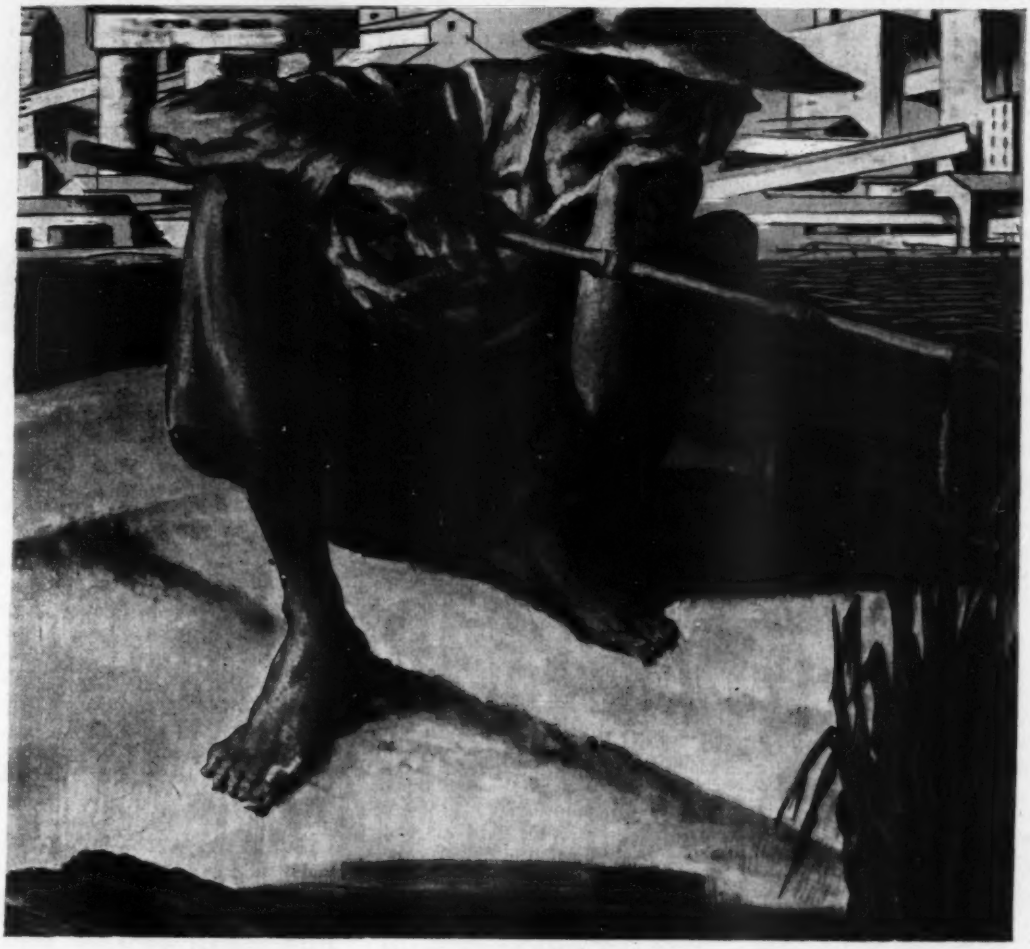
New Industrial Era Dawns on Alaskan Frontier

A new industrial era is opening in Alaska. It is based on a steadily rising demand for timber in the manufacture of plywood, paper and textiles. The territory will soon be able to boast its first pulp mill and its first plywood plant.

Much of the new development is centered in southeastern Alaska, a long narrow panhandle extending south along the western boundary of British Columbia. It is in this region that timber will be taken from the hitherto untouched Tongass National Forest to supply the pulp mill being constructed by Ketchikan Pulp Co. This operation, a joint venture of American Viscose Corp. and Puget Sound Pulp & Timber Co., is located at Ward Cove, a deep-water harbor seven miles north of Ketchikan.

L. P. Turcotte, president of Puget Sound Pulp & Timber, has reported that construction of the $36,000,000 plant is moving along "pretty well on schedule," and that the mill should be in

THE SOUTH—another in a series of scenes . . . areas where Appleton Wires serve the paper industry.



THE SOUTH—behind its carefully preserved tapestry of "old South" tradition, picturesque local color and romantic charm—is justifiably proud of thriving new industry, new commerce, new investments.

Here, too, pacing this energetic, creative, expanding activity, you'll find the paper industry. And, practically all of these mills already know that *Appleton Wires are Good Wires!*

APPLETON WIRE WORKS, INC., APPLETON, WISCONSIN

operation by June of next year. The mill will produce 300 tons of pulp daily at start-up and may be expanded to a 525-ton capacity. American Viscose has contracted for 100,000 tons of pulp yearly for a period of 20 years.

Other firms are planning plywood, pulp and newsprint plants in the area north of Ketchikan and near Juneau and Sitka. The area enjoys mild temperatures and heavy rainfall. Average Ketchikan temperatures range from 33°F. in January to 58°F. in August. The area averages 151 in. of rainfall annually.

S. Morgan Smith Merges R-S Products Corp.

S. Morgan Smith Co. of York, Pa., has announced the merger of its wholly owned subsidiary, R-S Products Corp., Philadelphia. The former firm will continue operations under its own name.

All R-S sales, engineering and administrative functions have been moved to York. Sales and engineering have been combined with the present Valve Division.

Pennsylvania Salt Mfg. Co.
has announced that its new $8,000,000 electrolytic chlorine and caustic soda plant at Calvert City, Ky., is now in operation.

Hercules Powder Co.'s
Cellulose Products Department has announced that Central Solvents & Chemicals Co. of Chicago has been appointed distributor for its chlorinated paraffins sold under the name "Clorafin."

R. S. Aries & Associates,
consulting chemical engineers and economists, has moved its executive offices to 270 Park Ave., New York, N.Y., because of the need for larger quarters.

Westinghouse Electric Corp.,
Pittsburgh, recently previewed the first all-aluminum control center—65 per cent lighter than its steel and copper counterpart.

CHARLES T. LOCKE, a sales representative for E. I. du Pont de Nemours & Co.'s Dyes and Chemicals Division, has established new headquarters in Plymouth, Wis. He has worked out of Chicago for many years.

GERALD E. HAUER has been named vice president in charge of engineering for Ameriacn Well Works, Aurora, Ill. He jointed the firm in 1946.

THOMAS C. REEVES, formerly a sales engineer for Oliver United Filters Inc. in New York, has been transferred to Ashville, N.C., as a filtration engineer. And *GEORGE T. TERSAGA* has been transferred from research and development to sales engineering in the Eastern Division.

R. C. GRALOW has been appointed director of product development for Corn Products Refining Co. He became associated with the firm in 1943 and has recently been sales manager of the Chemical Division.

W. D. SULLIVAN, assistant works manager of the Tubular Products Division of The Babcock & Wilcox Co. at Beaver Falls, Pa., has been transferred to the Boiler Division. He will be regional manager.

W. D. Sullivan

H. P. Espenmiller

HOWARD P. ESPENMILLER has been named to succeed George B. Nicholson as director of Black-Clawson laboratories in Fulton, N.Y. He joined the research staff of the Dilts Machine Works upon graduation in the pulp and paper curriculum from the State University of New York College of Forestry.

ARTHUR L. FOLTZ JR. has been named manager of the Detroit district office of De Laval Steam Turbine Co. of Trenton, N.J. He was formerly associated with Allis-Chalmers Mfg. Co.

A. L. Foltz Jr.

R. E. Kilty

RAY E. KILTY has been promoted to the post of assistant manager of the Boston office of A. E. Staley Mfg. Co. He was formerly a technical sales supervisor working with the paper industry in New England. Another recent A. E. Staley appointment is that of *JOHN WALSH,* who is to be technical sales representative to the industry in upper New York, Maryland, Delaware, and part of Pennsylvania and New Jersey.

NEW FEATURES of The Buda Co.'s line of FT fork lift trucks were demonstrated recently at the "Buda Magic" show in Chicago; Buda put the spotlight on such features as stripdown in 22 seconds, complete disassembly in 22 minutes, a clutch change in 30 minutes, short turning radius; the show is now on a nation-wide tour; shown at right is R. K. Mangan, Buda president, and Vice President Lee Daniels

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JOHN B. KOHLER, formerly president and chief engineer for The Kohler System Co., has opened offices in Crystal Lake, Ill. He is providing consulting services to the paper, paper converting, and printing industries. Mr. Kohler is the inventor of the Kohler system of unwinding and rewinding, with full-speed roll change.

J. DELANO HITCH JR., executive vice president of The Dorr Co., has been elected president of the firm to succeed E. R. Ramsey, who retired recently. Mr. Hitch joined the firm in 1927 as a field engineer.

JOHN T. WALMSLEY has been promoted to the Chicago and Midwest area as a salesman for Hooker Electrochemical Co. Since 1952, he has been in the Niagara Falls, N.Y., sales offices.

I. MELVILLE STEIN has been elected president of Leeds & Northrup Co. of Philadelphia. Mr. Stein, formerly executive vice president, succeeds Charles S. Redding, who becomes chairman of the board.

JAMES E. CARREL has been promoted to West Coast sales manager for the Container Products Division of Dewey & Almy Chemical Co. He handles sales of the division's can and industrial sealing compounds. The Organic Chemicals Division has appointed *THOMAS C. TARBOX* to head its sales force in the Middle Atlantic states.

FRANCIS E. PENNEY, at one time construction engineer for St. Regis Paper Co. at Oswego, N.Y., has been appointed supervising engineer of field construction

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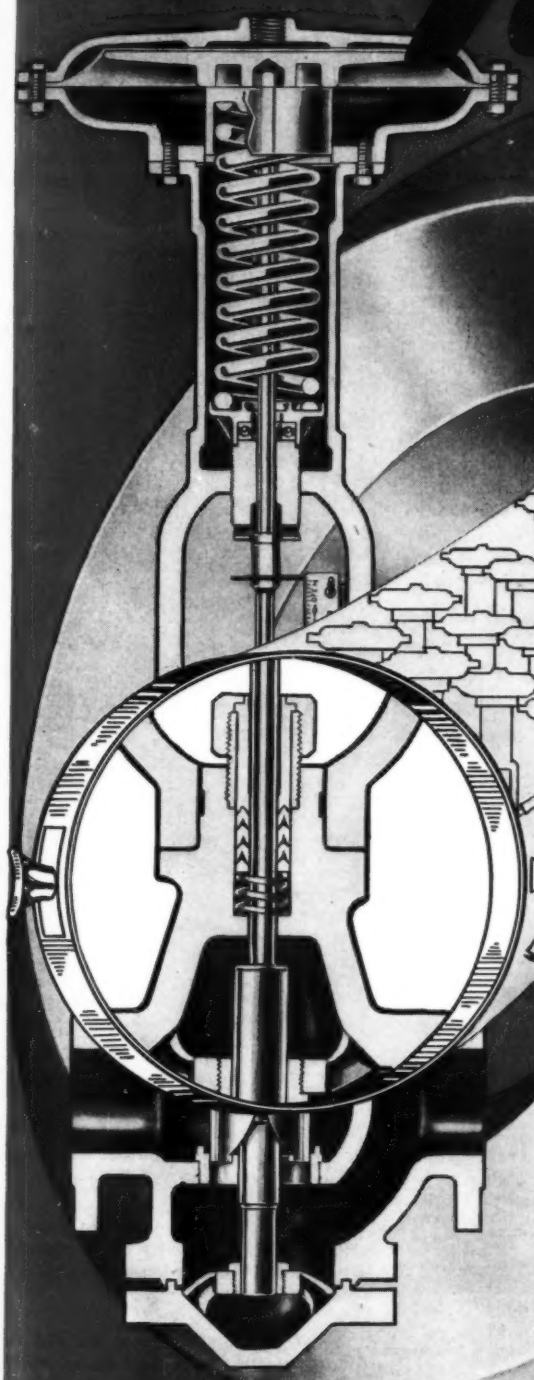

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Proved by many months of field service Fisher Teflon V-Ring Packing features

- No gland leakage.
- Used on wide range of pressures without appreciable change in friction values.
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- Chemically inert to all fluids up to 450° F.

Fisher Teflon V-Ring Packing is now standard equipment on all Fisher Diaphragm Motor Valves.

Bulletin E-200 gives complete details.

*Teflon is the trade name of E. I. Du Pont de Nemours & Co.

FISHER GOVERNOR COMPANY

MARSHALLTOWN, IOWA

operations for Chemical Linings Inc. of Watertown.

CLINTON H. JOHNSON has been named a sales engineer in the Electrostatic Precipitator Department of Koppers Co. Inc.

FRANK T. PETERSON, newly elected vice president of The Black-Clawson Co., recently visited South America to make a preliminary survey of the paper industry in an effort to establish facilities for the manufacture of B-C papermaking equipment.

F. T. Peterson

J. F. Fitzgerald

J. F. FITZGERALD has been elected an assistant vice president of National Starch Products Inc. An 18-year veteran with the firm, he has been manager of starch sales since 1948.

J. K. Perkins

R. C. Richter

JOSEPH K. PERKINS, formerly a representative of Improved Machinery Inc. in the Middle Atlantic states, has been transferred to the home office. Named to succeed him is *RUDOLPH C. RICHTER* of Lynchburg, Va.

F. H. (Curly) SINGLETARY will represent Appleton Woolen Mills of Appleton, Wis., in the southern territory: Arkansas, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas.

GEORGE T. OLSON, former forest products adviser to the Munitions Board, has been appointed market consultant to Soderhamn Machine Mfg. Co. of Talladega, Ala., manufacturer of debarking equipment and other sawmill and pulp mill machinery.

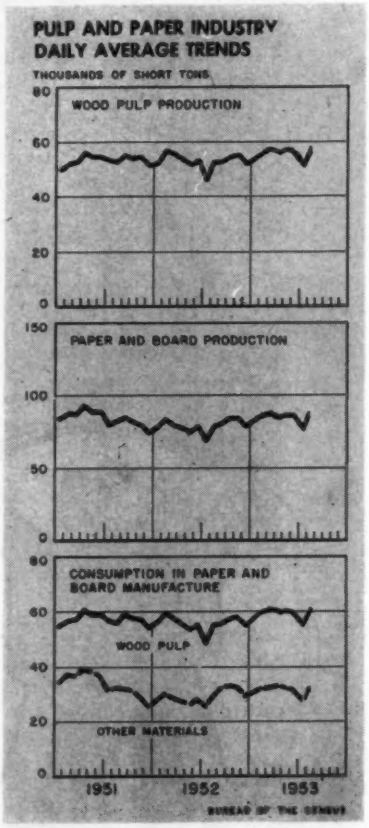
U. S. Paper and Paperboard Production

	Aug. 1953 (tons)	July 1953 (tons)	Aug. 1952 (tons)	Total 1952 (1,000 tons)	Total 1947 (1,000 tons)
Paper and Board, total	2,296,959	2,042,196	2,058,525	24,423	21,102
Paper, total	959,669	872,285	870,814	10,898	10,693
Newsprint	90,981	86,624	95,091	1,109	833
Groundwood paper (uncoated)	66,751	59,784	62,991	806	821
Printing and converting (coated)	100,230	93,009	88,462	1,096	
Book paper (uncoated)	141,465	128,112	115,980	1,482	2,208
Fine paper (writing, cover and text, bristols, thin paper and other)	108,168	91,846	100,213	1,295	1,172
Coarse paper (unbleached, kraft, glassine, greaseproof, vegetable parchment and other)	286,756	256,249	256,307	3,238	2,903
Special industrial paper	32,234	28,457	31,884	396	289
Sanitary tissue stock	102,276	101,833	92,701	1,148	894
Tissue paper	19,791	18,168	17,753	209	195
Absorbent paper	11,017	8,203	9,432	118	100
Paperboard, total	1,085,903	929,621	930,445	10,772	9,187
Containerboard, total	602,202	520,577	500,574	5,766	4,943
Liners	406,768	355,192	341,245	3,902	3,293
Corrugating material	166,475	141,278	135,333	1,583	1,370
Container chipboard	28,959	24,107	23,996	282	280
Bending board	314,483	264,758	271,238	3,144	2,249
Non-bending board	84,336	65,330	71,007	783	595
Special paperboard stock	78,504	73,952	81,741	1,009	1,307
Cardboard	6,378	5,004	5,885	69	92
Wet machine board	12,960	11,609	11,442	139	150
Construction paper and board, total	238,427	228,681	245,824	2,614	2,349
Construction paper	121,768	108,758	119,381	1,299	1,277
Hardboard and insulating board	116,659	119,923	126,443	1,315	1,072

Source: U. S. Department of Commerce.

August Pulp, Paper and Board Production

Paper and board production during August amounted to 2,296,959 tons, according to a report recently released by the Bureau of the Census. This is an approximate 12 per cent increase over the tonnage of 2,058,523 produced in August a year ago. The output of paperboard grades during this month, amounting to 1,085,903 tons, reflected an increase of 17 per cent over the production of August of 1952. Paper production, amounting to 959,669 tons, registered a 10 per cent increase from the 870,814 tons produced in August a year ago.



Pulpwood receipts at the pulp mills during August amounted to 2,696,565 cords, with consumption at 2,468,849 cords. Month-end inventories increased about 4 per cent to 5,432,613 cords.

Wood pulp production during August amounted to 1,529,716 tons, as compared to 1,382,248 tons produced in August 1952.

Wood pulp inventories at the end of August at the paper and board mills amounted to 524,445 tons, showing a small decline during the month. Month-end stocks at the pulp mills were 158,827 tons, slightly above the 152,074 tons reported at the end of July.

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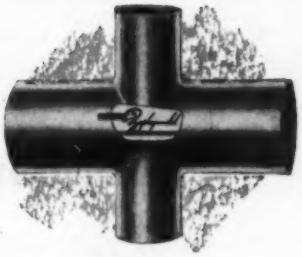
ZEPHYRWELD® WELDING FITTINGS

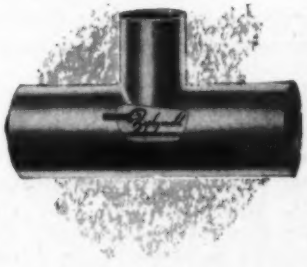
• TRI-CLOVER offers the most complete line of *Zephyrweld* Schedule 5 and 10 stainless steel welding fittings in sizes from ½" through 24" and 36" for use with stainless steel light gauge pipe. In addition, Schedule 40 fittings are available in sizes through 24".

These porosity-free fittings are fabricated from stainless steel types 304, 347, 316 and other stainless steel analyses . . and are annealed, pickled and passivated in sizes through 4". Larger sizes are passivated and may be annealed upon request.

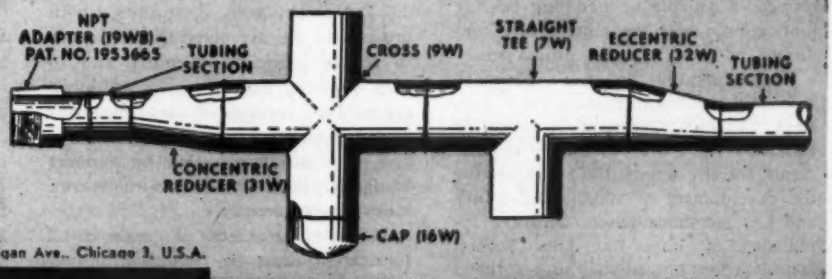
Schedule 5 and 10 fitting ends are cut flush for rapid welding. Because of their light gauge, no chamfering is required. Schedule 40 fittings are beveled in accordance with ASA specifications.

In addition to butt welding pipe fittings, Tri-Clover manufactures a complete line of stainless steel tube O.D. butt welding fittings for use with light gauge tubing.





• Shown at the right is a composite drawing showing the way in which Zephyrweld fittings are assembled, by butt welding, to light gauge pipe, or to one another. All ends are square and true—no chamfering is required to accomplish fast, clean welding. Note how Zephyrweld fittings are adapted to iron pipe size fittings through use of a special adapter.



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Our experienced engineering service is at your disposal to help solve your specific corrosion-resistant piping problems.

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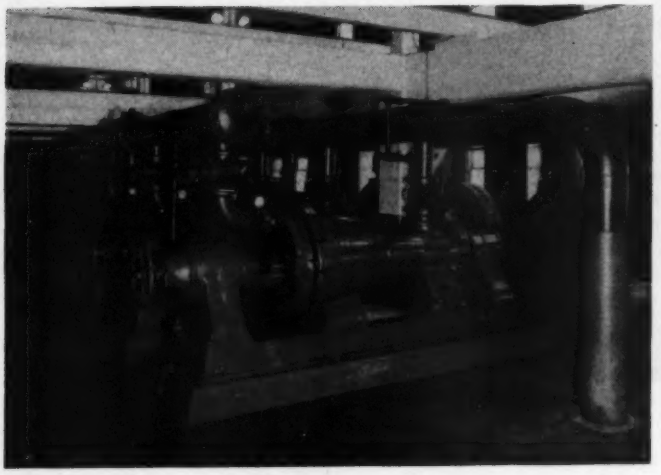


Fig. 1—Battery of jordans with direct drive and roller bearings

Fig. 2—Paper machine bearings lubricated with circulating oils

Lubrication in the modern paper mill

R. B. WHITE
Standard Oil Co., (Indiana)

▶ Are you correctly using the modern improved grease, oil, or multi-purpose lubricants?

IN THE PAPER INDUSTRY, as with most industries today, improved methods, better machinery, and greater production have all imposed special problems on lubricants. The petroleum industry is successfully meeting this challenge with the development of better lubricants capable of handling bearing lubrication under the more severe conditions of today's paper production.

The lubrication engineer's approach to adequate lubrication consists of three steps: (1) investigation of the operating conditions and the lubricating requirements thereby imposed; (2) requesting the development of suitable lubricants, and (3) recommendations as to the application of these lubricants. ' Several considerations immediately suggest themselves:

1. Greatly increased demand for paper products imposes the necessity for greater productivity. Higher speeds in the dryer end of paper machines, for example, require higher steam temperatures resulting in a greater burden on the lubricants used. In many instances, machines are operated at far higher speeds than those for which the machine was designed. Proper lubrication is essential to keep these machines running. Continuous production, 24 hours per day, seven days per week, is not uncommon. Breakdowns or maintenance down-time must be held to a minimum.

2. Multi-purpose lubricants, both grease and oil, are entering the picture to reduce lubricant inventory and to help prevent misapplication of lubricants. This becomes doubly important in paper mills where older machinery and new machinery may be running alongside each other, each with its own lubricant requirements.

3. The old argument of grease vs. oil lubrication must be reassessed in the light of new lubricant knowledge. In general, the following considerations are applicable: (a) oil is recommended where high temperatures prevail and where shaft speeds are high enough to maintain an oil film of adequate thickness; and (b) greases are preferred where speeds are too low to maintain an oil film, where excessive dirt contamination must be sealed out of bearings, where excessive water washing takes place, and where oil would be difficult to retain in contact with moving parts.

4. The question of plain bearings vs. anti-friction bearings must be carefully considered. In general, the trend seems to be away from plain bearings toward anti-friction bearings because it appears to be easier to maintain and lubricate the latter. There are exceptions to this, of course.

5. The special problems always associated with lubrication of paper mill machinery are water contamination, paper dust or pulp contamination, and heat. Properties must be built into paper mill lubricants to accommodate these requirements.

6. One of the most important considerations is the establishment and maintaining of lubrication records and the training and supervision of lubrication personnel in the mill. Shut-downs through bearing failure or for routine inspections, maintenance, etc., are costly. Proper selection and application of lubri-

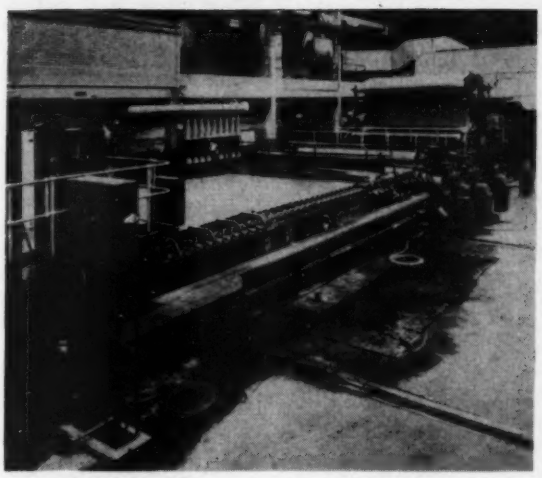


Fig. 3—Fourdrinier bearings are individually lubricated by means of grease fittings

Fig. 4—Dryer section bearings are lubricated with circulating oil

▶ Extensive research has yielded lubricants that will cope with all present-day lubrication problems, including those of water-contamination, dust and pulp contamination, and the high-speed and high-temperature operations of a modern paper machine.

▶ The cost of lubrication of a paper machine varies from 15-25 cents per ton of paper output. Maintenance costs resulting from improper lubrication, on the other hand, may be 10 times as high.

▶ Developing and maintaining an effective lubrication program and training competent personnel to handle such a program constitutes the greatest single factor in paper mill lubrication in which improvements may be made.

cants goes a long way toward preventing forced shut-downs and reducing maintenance costs.

Lubrication of pulp preparation machinery

Problems associated with the lubrication of barkers, grinders, chippers, pulp screens, deckers, wet pulp machines, beaters, and jordans (Fig. 1) have been more than adequately met with modern lubricants. Operating conditions of bearings on these machines are usually described as low speed, high pressure in some instances, and exposure to water contamination.

Many bearings are of the plain type, lubricated with oil; newer machines have anti-friction bearings, which are lubricated with either oil or grease. Oils used are sometimes straight mineral oils with good ability to separate from water and sometimes a mild extreme pressure characteristic is desirable. Anti-rust properties may also be required. Where excessive amounts of water are splashed on bearings, a compounded oil such as steam cylinder oil may be necessary. Where greases are used, the new lithium multi-purpose greases are excellent because of their ability to stay in bearings and to resist the action of water. Lubrication recommendations by the manufacturers of these machines should be closely observed.

Paper machine lubrication

Paper machines may be of either the cylinder or fourdrinier type. Fourdrinier type paper machines have been improved in design in order to permit running longer and at higher speeds. Bearings are more often of the self-aligning roller type in the new machines (Fig. 2). Steam pressures on the dryer rolls are greater to speed the drying rate. Lubrication problems associated with cylinder machines are much the same as those of the fourdrinier.

In older machines or slower running board machines, wet ends rolls of fourdriniers are usually equipped with plain bearings. Due to poor sealing, lubrication is made difficult by the severe water washing which takes place. Newer fourdriniers have anti-friction bearings with individual grease fittings (Fig. 3) which are periodically serviced with a pressure gun. The lithium multi-purpose greases have proved their ability to maintain proper bearing lubrication in wet ends of fourdrinier machines.

The dry end of the machine is quite another problem. Increased steam pressures result in higher temperatures at the bearing. This is an additional and severe burden on the lubricant. It promotes oil oxidation and deposits which must be cleaned out periodically. Pape. dust and water contamination from leaky steam joints add to the problem. Severe loading sometimes occurs which the oil film must be able to support.

Newer machines, especially those designed for high speed operation, often have self-aligning double roller bearings with an oil circulation system to provide for lubrication (Fig. 4). Dryer rolls weigh up to 18 tons or more and may

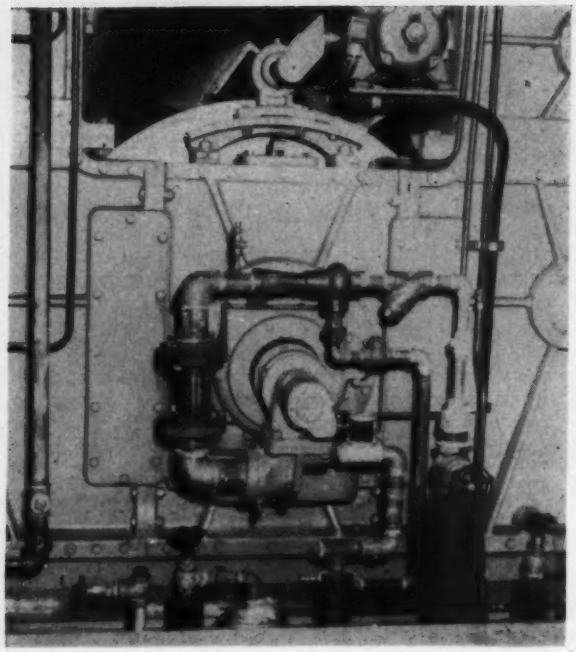


Fig. 5—Close-up of bearing on dryer section showing steam joint and circulating oil connections

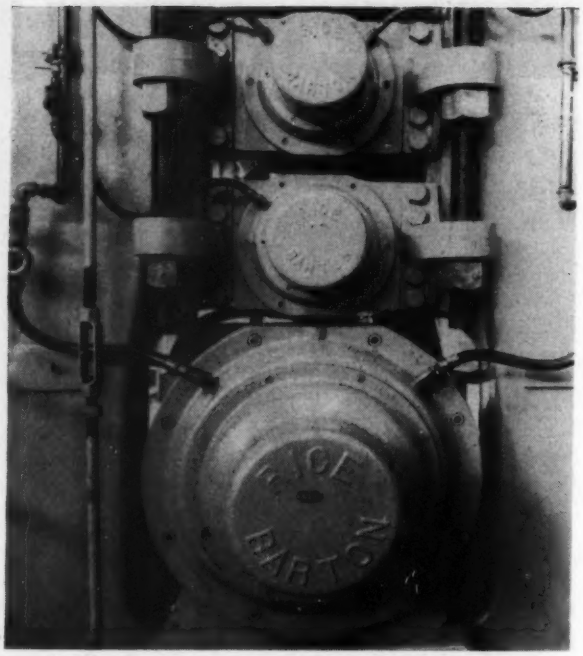


Fig. 6—Close-up of bearings on calender section of dryer showing oil circulation system

Fig. 7—Grease wall on dryer roll bearing showing "blocking" to reduce consumption

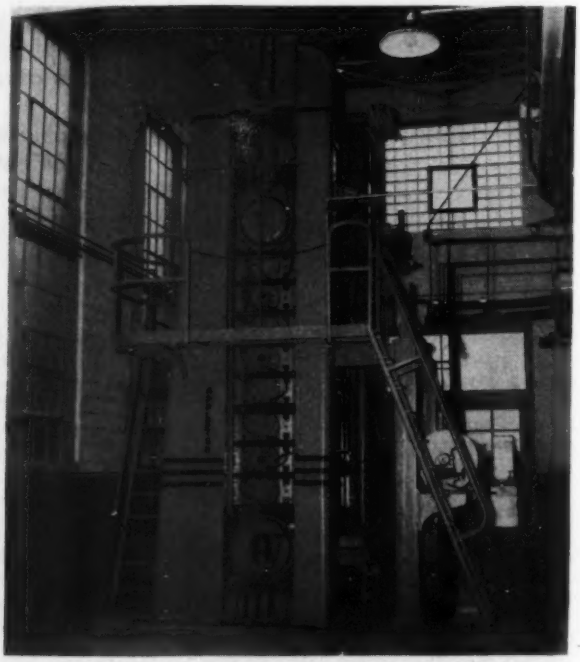


Fig. 8—Calender stack with circulating oil lubrication of bearings and hydraulic pressure and roll separation system

rotate at speeds above 150 rpm. Oil film temperatures in bearings may reach over 275°F. One machine is designed with an air space separating the steam line and the bearing to promote cooling (Fig. 5).

Circulating oils for use in these new oil circulation systems should have one or more of these added properties:

1. Oxidation resistance—to keep oil deterioration at a minimum.

2. Detergent-dispersant properties—to keep bearings relatively free of water, dust, and sludge and to carry these contaminants down to the settling tank and filter system.

3. Corrosion resistance—to prevent rusting of steel parts due to water contamination.

4. Demulsibility—to permit water to separate rapidly from the oil.

5. Extra load carrying capacity or mild extreme pressure properties—to prevent galling or metal-to-metal seizure.

Oils containing added properties are called "fortified," "additive," or "inhibited" oils. New circulating oils of the additive type have recently been developed specifically for use in dryer sections, e.g., STANDARD Dryer Bearing Oils No. 3 EP, No. 4 EP, and No. 4 D.

The EP products consist of high quality rust and oxidation inhibited oils with added film strength improver. They have been tested extensively in several mills and have been found to handle successfully the dryer roll problem. They have excellent water-separating properties. These oils have sufficient film strength to maintain lubrication at temperatures up to 300°F. They are specifically designed for use in high-speed, high temperature applications on antifriction bearings.

The D product is an inhibited detergent type oil (also having the film strength improver) which is particularly effective in cleaning up and maintaining cleanliness in a dryer section circulating system (Fig. 6). It has the same high film strength and oxidation resistance at high temperature as the EP oils. Special filtration measures may have to be employed to remove fine contaminants which do not settle out of detergent oils.

Filtration or reconditioning of circulating oils is an important measure. Return lines from the machine carry oil first to a settling tank where contaminants are separated and drawn off, then to a filter to further remove solid contaminants. Fullers earth, activated clay, or other adsorbent type filter media should not be used with additive type oils.

Oil-cooling devices may be needed on high speed machines where bearing temperatures run high to promote cooling and retard oil oxidation.

Many paper machines are in use with plain bearings on the dryer rolls. These may be lubricated by blocks of mill grease in a grease well or by flood lubrication with oil. One advantage of grease lubrication is that excess grease can be wiped off easily, whereas leaking oil may get into the sheet. A problem that has developed as speeds are increased in mill grease lubricated bearings is increased grease consumption and resultant dripping of lubricant. Grease consumption must be watched carefully and controlled to prevent this (Fig. 7).

Calender roll lubrication

Calender rolls usually employ plain bearings which can be adequately handled with fortified circulating oils. Principal problems are dust contamination, high temperatures and high pressures. New calenders are often provided with oil hydraulic controls to lift or to apply loading to the rolls (Fig. 8).

Gear drives lubrication

Improvement in design of gear drives has necessitated somewhat different recommendations for proper lubrication. Gear drives more often use cut gears with better tooth surfaces which must be protected with a gear lubricant adequate to handle the load and with anti-rust and anti-oxidant properties. In many cases, this may be the same circulating oil used in the bearings. Right angle drives often are of the hypoid gear type which require a mild extreme pressure lubricant which is non-corrosive (Fig. 9). Worm gear drives may require a highly-refined, compounded lubricant such as steam cylinder oil.

Open gears require a compound type (residual) lubricant which may be sprayed on the tooth surfaces. To avoid excessive throw-off, the spray should be adjusted to apply a coating of minimum thickness. Where high temperatures prevail, as on the back side of dryer roll drives, a more stable, tacky type grease is used.

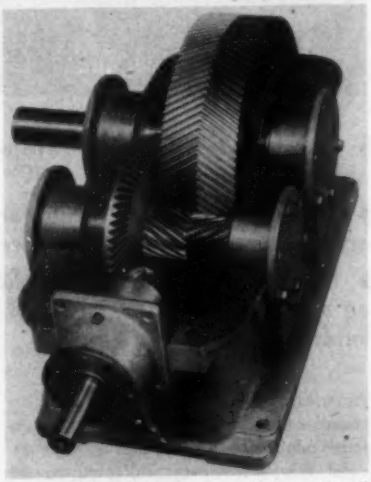


Fig. 9—A right angle gear drive with oil bath lubrication

Maintenance practices

Perhaps the largest single contributing factor to the maintenance of paper mill machinery is proper lubricating practice. The actual cost of lubricants is small—averaging 15 to 25 cents per ton; but the overall cost of maintenance may be ten times this amount. Thus, a 10 per cent saving, which can easily be effected through proper lubrication, could actually equal the cost of the lubricants. Decreasing machine down time, through effective preventive maintenance, can mean further substantial savings.

The key personnel in a position to accomplish these savings are the maintenance superintendent or lubrication engineer and his oilers. Two factors will contribute greatly to the success of a lubrication program: (1) adequate supervision; and (2) proper training of personnel responsible for lubrication.

Supervision

Assuming that proper lubricants have been chosen through actual experience with the lubricant on the machine in question and through consultation with the oil company representative and, perhaps, the machine manufacturer, some lubrication record system must be established to insure continued supervision. Circulating oils and bearings served must be periodically examined. Individual oiling or greasing points must be periodically serviced.

A card file should be established with cards for each machine, or group of machines, indicating at what intervals and with what lubricants periodic servicing should be accomplished. The work should be arranged so that it is spread over the year. Then, each month or each week, a set of cards will indicate the lubricating jobs to be performed during that period.

Another important factor is the close supervision of personnel doing the lubricating work by a competent supervisor well trained in lubricating fundamentals. Since one neglected bearing can cause expensive damage and costly down time, this point cannot be too strongly emphasized.

Training

Training oilers is an important consideration. The day of the squirt-can has passed. Modern machinery requires modern maintenance facilities. The man who lubricates the machine must understand the basic principles of lubrication, properties of lubricants, and the requirements of his machines. He should not be just an oiler—if possible, his job should be upgraded. The cost of training lubrication personnel is more than offset by the savings resulting from adequate preventive maintenance.

A training program for oilers can, in most cases, be set up right in the mill. A combination of conference type presentations and on-the-job training has proved to be quite successful. Many oil companies have literature and films available to augment the training program.

The problems of lubrication in the modern paper mill—although not greatly different from those which have always been present—have been intensified. Oil companies have developed, through extensive programs of research and testing, lubricants to handle present-day lubrication—and they will undoubtedly continue to meet the challenge.

The greatest single factor in paper mill lubrication in which improvements may be made is the installation and maintenance of an adequate lubrication program and the training of personnel to handle it.

Tree farms and your future*

J. P. WEYERHAEUSER JR.
President, Weyerhaeuser Timber Co.

▶ **Gap between forest growth and forest drain is being, and probably has been, closed.**

▶ **"Keep Green" and "Tree Farming" are industry-sponsored programs on privately-owned lands.**

▶ **Tree Farms have been established in 35 states and now comprise an area of 28,000,000 acres of crop-producing, tax-paying woodlands.**

THE FOREST PRODUCTS INDUSTRIES share the public relations problems of industry in general. In addition, we are further burdened by a particularly acute poser in attempting to create positive relations with people. We deal with trees—one of Mother Nature's own products—around which are woven many sentimental threads, both in song and verse.

These have had a strong emotional effect upon the public's attitude toward the forests. In fact, emotionalism has conditioned the majority of opinions about our industry.

Visibility, too, has helped to condition these atttiudes. Other natural resource industries—coal, oil, iron, and even fish—are underground and underwater for the most part, and their "diggings" are not so noticeable as is a recently cut-over forest area. So we find many persons looking askance at us.

Self-appointed forest saviors—and a number of politicians—have taken advantage of the nation's inherent sentimentality, and they continue to excite emotions regarding the conservation of our forest resources.

Two public-opinion surveys

Our forest industry is sensitive to public opinion; and we should be! Most of us really care what people are thinking. About 10 years ago this industry concluded that the public's attitude toward federal ownership was directly proportional to the people's feeling about the way private forestland owners were managing their holdings. There appeared then an angry surge of emotional antagonism toward the industry. The time had arrived for eliminating guesswork and finding out exactly what the American people thought about a highly controversial subject. We made an extensive public opinion survey. The results of that survey indicated a disturbing lack of public understanding of our industry.

So, 10 years of continuously increasing effort were expended by A. F. P. I. (American Forest Products Industries Inc.) disseminating information. We tried to explain—to all who would listen—our forestry policies, manufacturing practices, and the significance of our contribution to the American economy. At the same time we tried to lift ourselves by our bootstraps and improve industry performance by promotion of "Tree Farms", "Keep Green", and "Trees for Tomorrow". We talked more and had more to talk about.

How have we made out? Recently we took a second national survey to check our progress and to seek some new data so that we could stay on the informational beam. While we in the industry know the gap between forest growth and forest drain is being and probably has been closed, we wondered if the public knows it. And we wanted to find out if the public knows the part private forest industries played in creating this favorable situation.

Well, our efforts to tell the story of our industry have fallen far short of what we hoped to accomplish. The second survey reveals that the American people generally remain uninformed and misinformed regarding our forest resources and the economics of our industry.

A large percentage of the people still favor increased government ownership of forestlands. An alarmingly substantial group believes private companies are not sufficiently concerned about the proper management of the nation's forestlands. The majority says forests are not being replaced as rapidly as they are being cut. Our own industry-sponsored programs—"Keep Green" and "Tree Farming"—are more often attributed to various governmental agencies than to the private industry associations which gave them life and promote them.

Ten years ago about half the people thought that our timber resources were being depleted at a serious rate. Today 63 per cent believe they are.

While 54 per cent of the people admit they have heard about tree farms, only 14 per cent recognize them as privately owned and privately managed. Most assume tree farming is a conservation effort by federal and state governments. We must emphasize that the tree farm program is industry-sponsored, and that the acreages so dedicated are privately owned.

*Abridged from a paper presented at the U. S. Pulp Producers Assn. Executives' Conference, Sept. 15, 1953.

The major finding from the survey stands out: Large segments of the American public have absolutely no clear-cut impressions of the lumber, pulp, and paper industries. Until we can gain their understanding of our programs, their potential good will is lost to us.

The survey results are not entirely bleak. Our industry scores well in some important areas. We are considered progressive in adopting new ideas and better ways of doing things—but apparently not in forestry. We are credited with having developed new and improved products, with using new and better machinery, and with greater wood utilization. As an industry, we are not considered monopolistic.

Now that we know what the neighbors next door are saying, we know what our information programs must stress, and we know that the volume of our effort must multiply again and again to overcome the volume of negative propaganda.

▶ **Private forest industries have almost undisputed leadership in wise woodland management.**

▶ **Today's and tomorrow's wood and wood products are no longer physically restricted because of tree size and shape.**

▶ **The industry's future depends on how effectively it convinces the public that these accomplishments are taking place.**

Role of industry in forestland management

Too many citizens do not realize the vital role played by the forest industry in proper forestland management and whole-crop utilization. And, still worse, many of our fellow citizens look upon the forest industry role as a destructive one. It is important for us to know that there are little regional differences in opinion—our job is nationwide!

Certainly, when anyone checks the forest industry record for the past 11 or 12 years, we cannot be charged with inactivity. Tree farms have been established in 35 states. Today we have more than 28 million forestland acres of crop-producing, tax-paying woodlands in that progressive program.

More than 4,500 (hard-hatted) industrial foresters have been directly employed by the forest industries. What the public does not know is that the private forest industries have an almost undisputed leadership in the field of wise woodland management.

We must do more than provide useful products to the people of America. We have to take the time to tell those people what we are doing, how we are doing it, and why we are doing it. We must reiterate our aim of creating a permanent forest industry capable of producing a continuing supply of new and better products by managing our private industrial forestlands as tree farms.

Our enlightened self-interest, and the best interests of all the people, compel us not only to manage our lands for the maximum per-acre yield, but to encourage every other forestland owner to do likewise. We must help the farmer and owners of small acreages in solving their forestry problems, improving the productivity of their woodlands, and marketing their timber crops.

What about sawmill-size timber?

The proponents of additional federal restrictions justify it on the score that there is a continuing shortage—not in the over-all growth, but in the sawmill-size timber. They therefore are worrying about future lumber and plywood requirements.

We must admit that the size of the trees in the second cutting will be much less than in the first. We defend ourselves by pointing out that market requirements can be met with the newly developed gluing techniques, wood-fiber products, fiberboards, particle boards, and paper and paperboard products. We can take the wood apart and reassemble it into a multitude of carefully designed products. Today's and tomorrow's wood and wood products are no longer physically restricted because of tree size and shape.

Yet the argument persists, and the Paley Report predicts usage of lumber items from sawlog-size trees in 1975 twenty per cent greater than the current requirement.

Stanford Research Institute commissioned to prepare report

Our company has given Stanford Research Institute a commission to study, among other things, trends in building and the competition, both present and future, between various materials, so that it can come up with a studied forecast of future log requirements, including the controversial sawlog. This study, of course, will consider not only competition between products from wood and those of other industries, but also the intra-industry competition such as hardboards, plywood, softboards, sheathing lumber, fiberboard, container-board, and wood boxes, just to name a few. It will also undertake to predict how much of the growth in pulp requirements can be met in the future by a better integration of lumber, plywood, and pulp operations, and by industries better serving the smaller woodlot owner who now has no market for his crop.

Stanford Research Institute findings in this field should be of value to the forest industry in many ways. We ask your help in providing the Institute with the information sought. We propose to make the results of the study known next spring.

Step up flow of information

But one fact stands out clearly: We must step up the flow of information. Our industry has not yet earned the respect of the American people. We are suspected of many unpopular things, and we have not yet convinced the public that the forests are being renewed, that industry is doing the lion's share of the job, and that there will be enough to satisfy the probable demand for all products from wood.

Granted, this is only one phase of good public relations, but it is a phase in which everyone is interested. It is the phase which differentiates our industry from all others. We must not neglect the garden variety of matters by which the public judges all industry, and we must work much harder on this one which is peculiar to our industry and about which almost everyone has a preconceived idea.

I am afraid that we have been inclined to "Let George do it" and have the various associations front for us in this matter. The result is that the tide is still against us. The story of any group is no better than its weakest component. Many of us have a better forestry, sustained-yield, tree farm story to tell than an industry-wide group.

It sems to me that we should—as individual companies or operations—use more of the tools of communication to this creditable end. National advertising, no matter what its purpose—whether product promotional, stock sales promotional, or institutional—should carry the tree farm story. So should newspapers, radio, television, moving pictures—we all use them to some extent. The competition for our public's attention is tremendous, and there is no way to multiply our effort sufficiently except with everybody getting into the act.

Our tree farm story is close to the hearts of many. It is true. It is dramatic. It is picturesque and colorful.

Our future certainly depends not only on how the industry preserves its sources of raw material, but also on how thoroughly it convinces the people that it is doing just that.

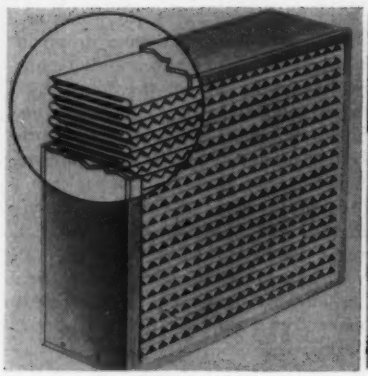


Fig. 1—Filter units consist of a continuous sheet of filter paper fan-folded over separators having V-shaped corrugations perpendicular to folds and filter faces; thus, air passages are provided to and from filter paper surfaces

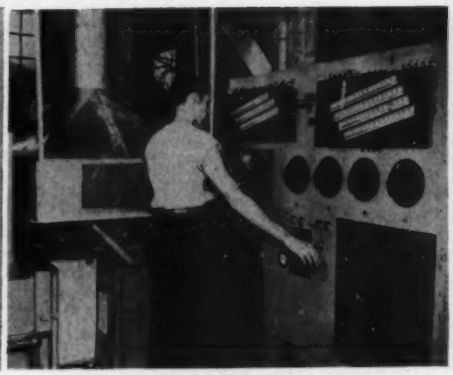


Fig. 2—Unit is tested with specially built equipment that generates dioctyl smoke consisting of particles 0.3 micron in diameter; measurement is made by photoelectric equipment; new filter must stop 99.95% of the particles

Fig. 3—First operation in making the MSA Ultra-Aire space filters is fan-folding the filter paper over temporary inserts; V-shaped corrugated paper, inserted below, provides air passages through the filter unit

Special filter paper shows excellent performance in cleaning air

Special dry filter paper removes air-borne bacteria and dust particles as fine as 0.05-0.1 micron. It should find many applications in protecting industrial products and processes, including dust-sensitive paper specialties.

THE FILTER MATERIAL, developed during the war years for military gas masks and only recently put into a simple unit suitable for general use, is a porous, matted paper made from a pulp containing the extremely fine Bolivian or African Blue asbestos fibers and Esparto grass fibers. Moisture resistance is provided by treatment with a precipitated, hydrated calcium silicate known as Silene.

The final product is 0.035 to 0.055 in. thick. When fan-folded over corrugated paper spacers and sealed into a frame, the resistance of the filter unit at a flow velocity of 5 ft. per min. through the filter media is only 1 in. of water at temperatures between 65° and 75° F.

Four filter sizes with capacities up to 1,000 cu. ft. per minute have been standardized in order to meet a maximum of user requirements from distributors' stocks. In the largest standard size about 300 sq. ft. of filter media are provided in a compact unit 24 × 24 × 11½ in. Any desired size can be obtained, however, if quantity requirements or special circumstances justify production.

Development of the Mine Safety Appliances Co. Ultra-Aire space filter dates back to the war years, when the Chemical Warfare Service needed a better filter for gas masks. After its development, it was found suitable also for the extensive needs of the Atomic Energy Commission for removing radioactive particles and other toxic particles in the air. Other uses quickly followed.

Construction of the filter

A filter unit consists of a continuous sheet of the filter paper fan-folded over specially prepared corrugated paper. Folds in the sheet are on the exposed faces of the filter unit, and corrugations of the separators are perpendicular to the filter faces, thus forming passageways to and from the surfaces of the filter material. Corrugations are V-shaped instead of the common U-shape in order to minimize the contact area and to expose a maximum surface area of the filter paper to the air. The number of folds varies slightly with the thickness of the filter paper and the heights of flutes in the corrugated separators but is close to 150 in. in the largest filters.

Construction of the filter unit is simple but subject to rigid specifications to assure no leakage during the life of the filter. Frames are of top grade lumber, put together with a rabbeted joint. Sealing adhesive is used plentifully in the joints and on the inside of the wood frame, where it is applied in two coats. Trimmed ends of the folds are filled or stiffened with several spray coats of diluted adhesive, after which the bedding application can be sprayed or brushed on. The adhesive remains tacky between coats in order to form a continuous homogeneous bond between the media and frame. Gaskets of ¼-in. unicellular sponge rubber on the edge of the filter frame seal them into ventilator ducts or filter banks.

Performance and tests

Performance of the material is measured by the NRL Penetration Meter using dioctyl phthalate smoke from a DOP smoke generator. At least 99.95 per cent of the particles in this smoke,

Fig. 4—Fibers in an area 0.5 mm. in diameter on the filter paper (here magnified 50 times) would stop many dust particles

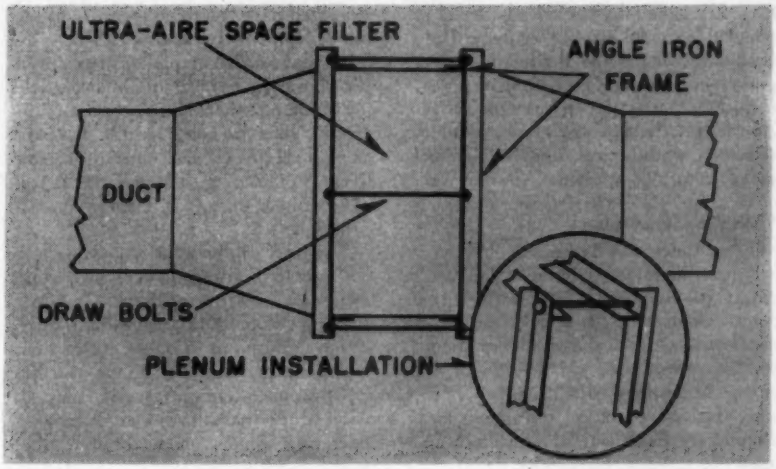


Fig. 5—A simple way of installing the filter units in air ducts is by use of angle iron frames drawn against the sponge rubber gaskets on each side of the units by means of draw bolts

Fig. 6—Static pressure drop across a bank of filters being measured; air flow resistance starts at 1 in. water

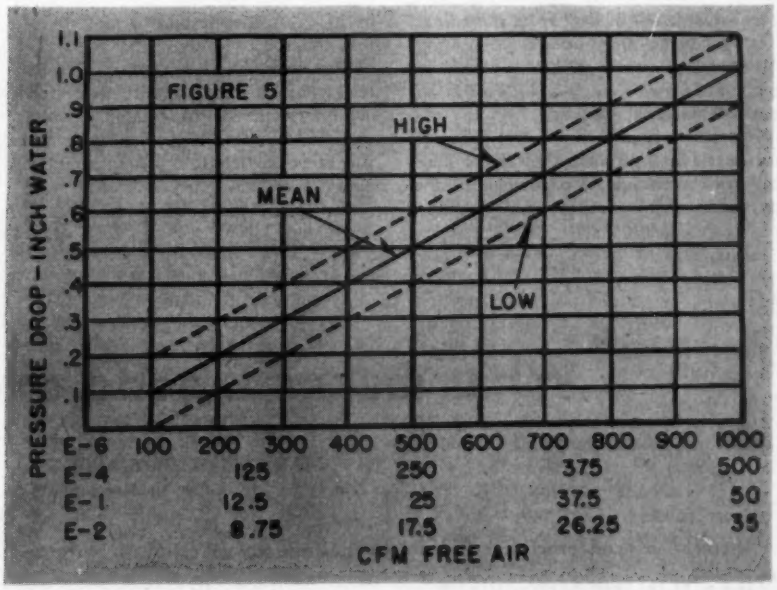


Fig. 7—Pressure drop through MSA Ultra-Aire space filters is directly proportional to the rate of air flow; dotted lines show a spread of only 0.2 of water over the mean pressure drop of filter units

which are 0.3 micron in diameter (about 12 millionths of an inch), must be removed in every filter inspection test.

In testing the completed filter unit, the stand, which is shown in Fig. 2, is flooded with dioctyl phthalate smoke to establish a 100 per cent reading. The system is then purged and a filter unit placed in the duct. DOP is again introduced, and penetration through the filter is measured by means of a photoelectric cell which operates as a particle counter under the conditions of the test. Regulation of particle size and determination of particle intensity are governed by special equipment developed by the Chemical Corps and Naval Research Laboratory. The method is more reliable than those based on weight or strains. Filters showing 0.05 per cent or more passage of DOP particles are rejected. Others are marked on the side with the results of the test.

Filter life depends on the number and size of particles contained in the air, the rate of air flow, and the end resistance that the system can handle. In one test with "normal industrial city air," a filter of 1000 cfm capacity was operated at full capacity 24 hours a day for three months before its resistance increased from 1 to 2 in. of water.

An end resistance of 4 in. water gauge is practical if the system permits. If a low pressure system can handle only an additional pressure drop of 1 in. of water, filters must be operated at flow rates less than rated capacity. Two 1000-cfm filters might be used for every 1000 cfm, with 500 cfm through each. Initial resistance would then be 0.5 in. water gauge, and the filters would be discarded when resistance increased to 1 in. Longer life could be obtained by using four of these filters in parallel, starting with a resistance of 0.25 in. of water.

The life of filters should be increased by using coarser filters ahead of them so

that they have only the finer particles to remove from the air. Air contamination should be reduced to a maximum of 1 grain per 1000 cu. ft. before it is economically practicable to use the Ultra-Aire filter. At this concentration a 1000-cfm filter would remove a pound of dirt in 117 hours of operation.

Varied applications

Filter units may be sealed directly in air ducts or hoods, or built into a wall singly or in banks. Either face of the filter unit may be the inlet or outlet for air flow, but the direction of flow should not be reversed during the life of the filter. Mountings should provide not only for an effective, continuous seal around the frame but also for quick and easy exchange of filter units.

By far the largest application of the filter material so far has been for health protection of people working in atomic energy plants where radioactive, airborne dusts must be kept from spreading. Tests indicate that no other filtering medium or material gives as comparably high a factor of safety in protection against the finest particles.

Protection against radioactive particles in the air is a problem that is not confined to protection of personnel. In the manufacture of photographic film and sensitized paper or some specialty papers the presence of these particles or other dusts may affect the quality of the product. Since the number of these particles in the atmosphere may gradually increase, filters are being used in one plant experimentally to determine their effectiveness in keeping such particles as well as other inert dust away from production processes.

The filter can be used to keep bacteria out instead of acquiring expensive equipment for destroying them. This performance should find important application in hospitals to isolate rooms housing patients with contagious disaeses; or post-operative infections may be checked by having the air supply of operating rooms pass through these filters.

For the protection of health and as a protection against contamination that may be caused by an individual's breathing, the material has also been made by M. S. A. into respirator filters which may be used to protect either the wearer of the mask or to filter out exhaled bacterial particles that might affect sterile conditions in the production of pharmaceuticals, in food processing, or other processes in laboratory or production operations.

An indication of the possibilities for filtering out undesirable bacteria is the fact that the largest industrial users of this filter material, other than atomic energy plants, are manufacturers of pharmaceuticals. There are several installations for enclosed systems in which antibiotics are made. In these systems air is supplied by compressors, and filters are used on the intake to remove airborne dusts and bacteria.

Similar problems are encountered in food processing plants which may be solved more satisfactorily than before with this filtering material. An interesting use of 8 × 8-in. Ultra-Aire filter has been made by a tank car transporter of molasses. As the tank is drained, the air that replaces the molasses has to pass through the filter, thus keeping the tank free of bacteria, avoiding high spoilage of residual molasses and reducing the amount of cleaning that had been necessary when ordinary unfiltered air filled the tank.

Fine dust alone is detrimental in the processing of film, particularly motion picture film that will be greatly magnified on a screen.

Similarly, manufacturers of clear and light colored plastics, textiles, and paints have dust problems that can be minimized through the use of the Ultra-Aire filter.

What makes a good executive?*

CRAWFORD H. GREENEWALT
President, E. I. du Pont de Nemours & Co.

There is no fixed procedure, no precise pattern, no yardstick of performance in the advance appraisal of executive potential.

While leadership, judgment, and vision are important attributes, the executive's most essential function is to reconcile, coordinate, compromise, and appraise the various viewpoints and talents under his direction.

The executive function is very largely a twentieth century phenomenon of American creation. It is the business executive, and not the social reformer, who is now providing the initiative in our rapid advance toward a higher standard of living.

Enhancing the prestige of an executive career may be the only remaining incentive that will successfully attract talented young men to business in the absence of adequate monetary compensation.

FEW PEOPLE start out in life with the idea of becoming an executive. Most begin their careers in some specialized field such as science, finance, or law. Executive responsibility comes later in life, often as a complete surprise and almost invariably as a result of the office seeking the man. This is as it should be, for, while there are always numerous volunteers for the higher caliber jobs, the raised hand is rarely a satisfactory guide.

Attributes are intangible

"What makes a good executive good?" is a most difficult question.

In other fields of endeavor talent can be recognized readily and quickly. We have only to listen to a pianist, examine the work of an artist, or observe an actor on the stage to determine whether or not they are good. A lawyer must have passed a bar examination, a surgeon can refer you to his diploma, the ball player can point to his batting average.

Among executives we can recognize competence only after long periods of observation, and even then there are sometimes large differences of opinion. Infinitely more difficult is the appraisal of executive potential in advance.

The attributes that make a successful executive are largely among the intangibles. A job analysis, useful enough in other areas, falls down completely in appraising executive potential. In the executive area there is no fixed procedure, no precise pattern, no yardstick of performance that can be counted and measured.

Some say that the essential quality is leadership, and this is in fact an important executive attribute. But here

*Abridged from a speech presented at the Executives' Club of Chicago.

again we betray the limitations of our vocabulary, for while leadership is important, it is only partly the answer. An articulate clergyman, for example, may be an able reader of ethical thought, or a soldier may exercise great leadership, entirely through courage and personal example. Neither of them need necessarily have executive talent as we conceive it.

Judgment is important. Vision is probably essential. We could exhaust our list of virtues without reaching the core of the problem. For not all men with leadership, with judgment, with vision, are in any sense of the word good executives.

The basic requirement of executive capacity is the ability to create a harmonious whole of "dissimilar disciplines." This is another way of saying that a good executive can make a smoothly functioning team out of people with the many different skills required in the operation of a modern business. His most important function is to reconcile, to coordinate, to compromise, and to appraise the various viewpoints and talents under his direction to achieve maximum individual contribution to the business at hand.

There was a time when the boss prided himself on personal experience with every job in the shop. If this view ever had merit, it has long since become entirely unrealistic. Today, specific skill in any given field becomes less and less important as the executive advances through successive levels of responsibility.

And so as we pass more and more away from special, measureable skills into the less definable intangible talents, it becomes clear that the selection of executives becomes more of an art and less of a science. We must rely in large measure on intuition and hope and pray that our candidate's performance will reflect our wisdom rather than our incompetence.

Achievements are less spectacular

Achievement in the executive field is much less spectacular than comparable success in many of the professions—the scientist, for example, who wins the Nobel Prize, the headline name who is elected governor, the skillful politician, the articulate college president. In fact, the more effective an executive the more his own identity and personality blend into the background of the organization. Here is a queer paradox. The more able the man, the less he stands out, the greater his relative anonymity outside his own immediate circle. Perhaps this is also why his importance and his contribution to the national development are so little understood and why they have been so neglected by historians, past and present.

Yet the fact is that the business executive's part in our national development has been as profound—and far more lasting—than the exploits of the warriors and the makers of laws. The accomplishments of the American system are quite as much a triumph of executive skill as they are of technical development and financial venture.

In earlier days, business units were small and technology was simple; the proprietor of an enterprise could hold all the reins firmly in his own hands. But as production became more complex the tools and equipment grew more expensive, and the capital to buy them had to come from groups of people rather than a few individuals. At the same time we began to require more and more the services of specialists and technicians. Business became increasingly a team effort, in which the contribution of each individual and each group had to be integrated with the contributions of others.

In this way, the executive came into being, and his function gained importance as the size of the business unit grew and its activities became more intricate. This has happened very quickly, as history is reckoned. The executive function is very largely a 20th century phenomenon of American creation.

The America we know today—the high living standards, its strength, its position as a world power—would have literally been impossible to achieve without the executive function. Our living standard and our strength arise out of our ability to produce. And production today in the required quantity, quality, and price depends on every man of executive talent to tie the diverse ends together and weld them into an effective machine.

The Executive's contribution

American industrial development has come about through the process of innovation, and it is here that the executive has made his most significant contribution. Philosophers of an earlier day would be astonished to see that it has been the businessman, not the social reformer, who has condemned and destroyed the *status quo*.

We have leisure; we have the opportunity for effective cultural and social thought; we have our high living standard only because of the increased productivity brought about by continual innovation and creative development. And the horizon still extends far beyond the range of our present vision.

The accomplishments of our civilization are largely due to people who are sufficiently acute and perceptive to venture into unknown fields, and who can organize the technical and financial resources required for success. It is in this way that our economy has continually refreshed its vitality. The initiative has come from our businessmen. This is not to deny that scientific discovery is the raw material of our advance. Yet science or invention alone may be of only academic interest or significance—unless, through business development, it descends from the clouds to join the service of men.

This, in fact, has been the peculiar genius of American business. Many of the important scientific discoveries of the past have been of European origin, yet it was in the U.S.A. where they found their real utility. It took American business technology to bring many of these discoveries to popularity.

More executives needed

If we are to continue our era of progress, we shall have to attract more bright young men into business. The more we have, the greater our chance of developing the leaders of tomorrow.

In these days of high personal income taxes, the money incentives so characteristic of business are declining in attractiveness. There are some who take the wry view that taxes are here to stay, and that the rates will remain unduly high throughout the foreseeable future. To be realistic, we must assume the chances of substantial improvement in the tax picture are remote.

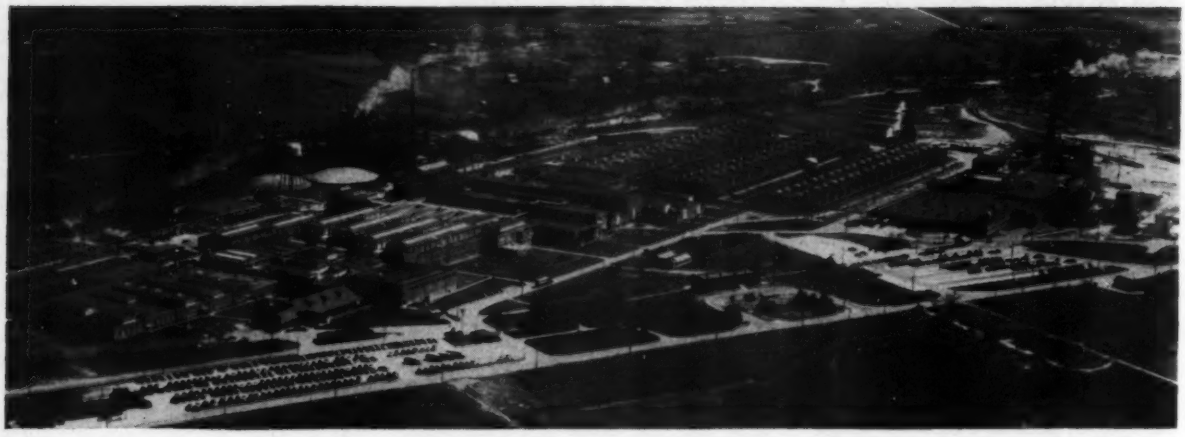
If not money, what then is an executive's reward? Many companies have explored the possibilities of non-monetary incentives as the new coin of executive reward. Some of these seem to be simply compensation in disguise and may encounter adverse tax interpretations later on. Others, such as longer vacations, are transplanted from other fields and may or may not prove adaptable to the business climate.

Whether they will be fruitful we do not yet know. The nice thing about money is that it has such a wide circle of admirers. People spend it in different ways, but its appeal is generally the same, even admitting that the perversities of human nature are such that whatever fascinates Peter may bore Paul.

While hoping for the best in these interesting experiments, the only solution would seem to appear in enhancing the prestige of an executive career.

Business as a profession has come of age, and its members can stand before the world as practitioners of a difficult and complex art, without which the world would be the poorer. It is high time that business shed its inferiority complex and take its rightful place in the ranks of other honored professions.

Prestige for the business profession will come with a clearer understanding and appreciation of the contribution business is making to the social, cultural, and spiritual advancement of America.



Ecusta Paper wins Fritz safety trophy for '52

Winner of the NSC grand prize for the best safety achievement in the pulp and paper industry in 1952, Ecusta Paper Corp. of Pisgah Forest, N. C., boasts a modern and efficient safety program. In this article, Mr. Newbury discusses the organization that helped the cigarette paper-producing firm record its outstanding 0.42 frequency rate in 2,386,878 man-hours. In this accomplishment, the 1,219 employees have worked 1,486,979 man-hours since May 17, 1953, without a lost-time injury.

H. E. NEWBURY
Safety Supervisor
Ecusta Paper Corp.

SAFETY COMES FIRST at Ecusta. And top management as well as all superintendents and supervisors back the safety department in the fact. They have accepted safety as an operating problem.

Our accident prevention program has paid dividends because our employees are enthusiastic about safety: dividends to the employee himself, to the supervisors, to smoother operations throughout the plant, and to the company. The firm profits as a result of lower compensation rates brought about through the reduction of serious injuries and the costs that accompany them.

Accident experience at Ecusta has shown steady improvement in the years since 1939, when the plant was put into operation. Especially during the past six years has the record been outstanding:

Year	Man-hours	Disabling Injuries	Frequency Rate
1947	2,950,107	11	3.73
1948	3,034,174	25	7.53
1949	2,599,228	12	4.62
1950	2,520,039	8	3.17
1951	2,838,834	4	1.41
1952	2,386,878	1	0.42

In addition to the suffering and loss of wages that have been spared our personnel as a result of the decrease shown in serious injuries, Ecusta is now paying its insurance carrier less than 40 cents per $100 payroll for compensation insurance. This contrasts with the $1.46 charged in 1941.

Safety organization at Ecusta

In order to achieve the frequency rate recorded in 1952, our Safety Department relied on an organizational setup that had been time-tested. Its efficiency resulted from constant study and change over the years since it was established.

The *General Safety Committee* meets

Edward Benton Fritz Memorial Trophy awarded to Ecusta at recent National Safety Congress

L. F. Dixon
General Manager

Lee M. Bauer
Production Manager

Safety Supervisor H. E. Newbury (r) and J. D. Mann, fire inspector

NSC Group A plaque earned for finishing in first place during the 1952 pulp and paper contest

One of the many "goggle areas" where safe practices are strictly enforced at all times

Safety sign at the main entrance that is seen by 75 per cent of Ecusta's personnel daily

monthly and is composed of representatives from top management, superintendents of all departments, the medical director, and the safety supervisor. Chairman of the group is the production manager, Lee M. Bauer.

Each department stages monthly safety meetings for the various shifts, and the personnel is impressed with the fact that safety is an operating problem, that without it quality and production would surely suffer. Every effort is made to get the new employees—as well as those who are old in length of service—to take an active part in the prevention of accidents.

Since the personnel of the *General Maintenance Department* works throughout the plant, department staffers hold safety meetings each Monday morning.

Investigating committee

An *Investigating Committee* has been established to study thoroughly all submajor and major injuries in an effort to eliminate any unsafe practices or conditions that may be brought to light. (The Safety Department investigates any accidents that could have resulted in serious injury, regardless of how minor the resulting injury might be.)

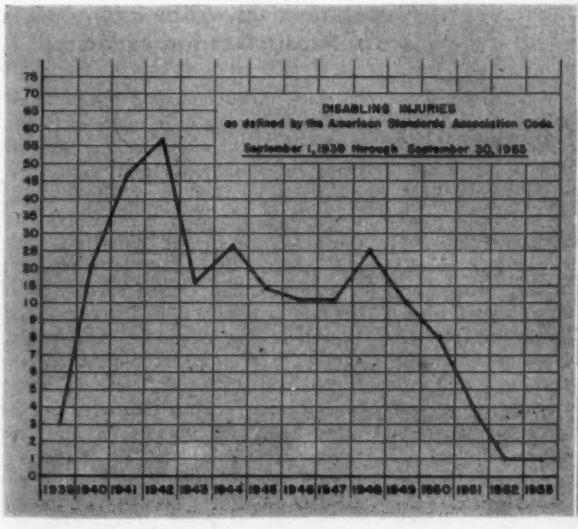
Department operations

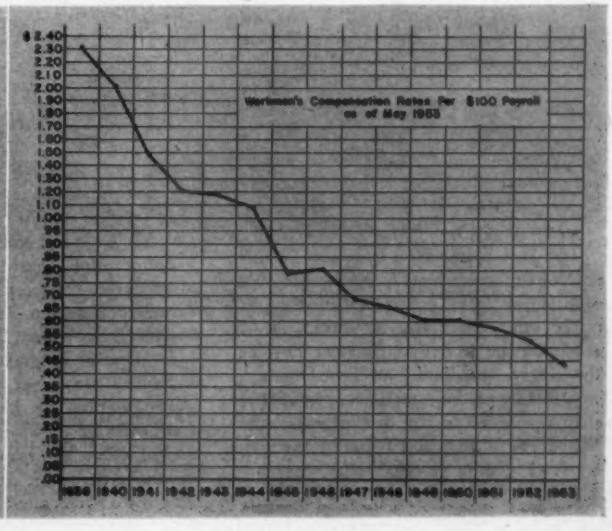
In administering the accident prevention program, the Safety Department:

1. Sees that every new installation of machinery or equipment is adequately guarded before being put into operation.
2. Regularly inspects various departments throughout the plant, noting any potential accident hazards or unsafe practices and poor housekeeping that need attention.
3. Arranges safety talks when requested by supervisors or when deemed advisable by the department.
4. Furnishes personnel with protective equipment as required and offers instruction in its proper use; additionally, the department checks such equipment at intervals to insure its good condition.
5. Trains fire fighting and emergency chlorine crews in the proper use and care of all types of gas masks.
6. Handles the material for the safety pages in Ecusta's monthly house organ, *The Echo;* composes and posts safety and welfare messages on the large board at the plant's main entrance.
7. Keeps cumulative accident analysis data based on injury reports received from the Medical Department and sends monthly reports to all departments with reference to injuries that have occurred in their area of operations. In addition, the department prepares the accident experience reports submitted each month to top management and the General Safety Committee.

Strengthening these primary functions are the safety supervisor and his assistant, who spend as much time as possible in the plant making personal contacts with employees. We are endeavoring to enlist the help of every individual in the "Crusade Against Accidents," and we do feel that much can be accomplished through the personal touch.

Furthermore, the safety program does not cease at the main gate. Every effort is made to conduct a well balanced





accident prevention campaign, and toward this end we are continuously trying to publicize safety at home, on the farm, in the community, on the highway, and at work and play.

Exemplifying the work of the department is its activity in fire prevention. Since falling heir to the Fire Inspection and Protection Program a year ago, we have found that this phase of our operations requires—and rightly so—a good share of our attention.

Workmen's compensation

The Safety Department handles the filing of necessary injury reports with Ecusta's insurance carrier, as well as the processing of all papers and payments in connection with temporary total or any permanent partial disability cases. The department is responsible for all dealings with the State Industrial Commission and for all claims through the Workmen's Compensation Act.

For an injury arising out of and in the course of employment, the medical and any possible surgical or hospital bills are paid by our insurance carrier. All bills are subject to the approval of the state commission; and in no case is a physician or surgeon supposed to bill the employee for services in connection with an occupational injury. Compensation for cases resulting in loss of time away from work is paid on the basis of 60 per cent of the injured employee's weekly earnings, with a maximum of $30 per calendar week. Payment begins with the eighth day of disability. There is no compensation for the first seven days of disability unless the lost time extends beyond 28 days. The maximum for death cases is $8,000, with the amount being paid over a period of 350 weeks.

As an example of specific losses, the Workmen's Compensation Act lists as follows the payments for thumbs and fingers: Thumb, 65 weeks; index finger, 40 weeks; second finger, 35 weeks; third finger, 22 weeks, and fourth (little) finger, 16 weeks.

Such payments are usually on a monthly basis and are tax-free. They are not to be shown on income tax reports as earnings, and all employees are so advised by the Safety Department.

Solving control problems in the paper mill

LEO WALTER*

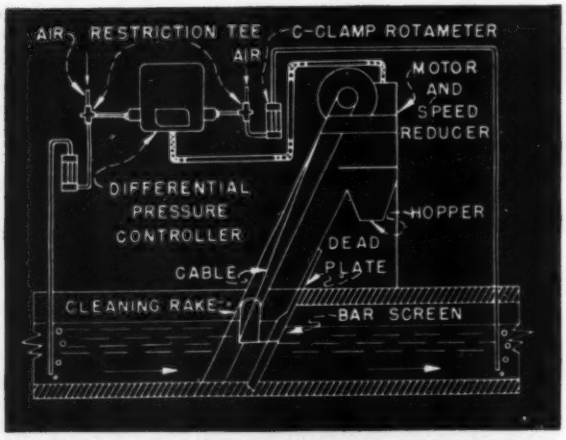


Fig. 1—Control of bar screen cleaning

Complete factory-assembled consoles or panels provide (a) marked reduction in installation time and (b) increase in process efficiency. Both the mill executive and mill superintendent will be interested in the solution of various control problems discussed at random.

ANY CONTROL PROBLEM for industrial processing of goods has a suitable solution, if correct choice is applied to the control instrument possessing the necessary characteristics required by the controlled process. Factors to be considered are (a) required accuracy of control; (b) controllability of the process; (c) simplicity and reliability of installation, and (d) cost, which should be commensurate to achievements.

Control of bar screen cleaning

The best method for solution of this control problem seems to be the use of a differential lever controller of the air purge type. Since the accumulation of solids on the screen restricts the flow of the slurry, the liquid level on the upstream side of the screen becomes higher than the level on the downstream side. When the differential between the two levels reaches a certain value, the controller energizes the cleaning mechanism, which continues to operate until the differential returns to normal. Operational failures of the controller arising from accumulation of grease or other solids on any part of the control system are prevented by the air purge.

Differential control provides maximum power economy without danger of excessive build-up of screenings, since the controller cannot "forget" to operate. It is superior to timed operation, which has often been used, because it will initiate cleaning as frequently or as infrequently as may be necessary. Timers, on the other hand, must be adjusted to handle a given set of conditions. If the amount of screenings should increase or decrease, timed operation results in insufficient cleaning or in waste of power.

Differential level control is also superior to float type level control because it is not subject to failure caused by deposits of grease or other solids on controller parts. The differential type also has the advantage of recognizing level differentials caused by changes in the rate of sewage flow. For example, if the rate of flow should be decreased and cause a level drop, the differential controller will still start cleaning action when necessary. Float controllers, on the other hand, fail to operate until the normal level is reached. Fig. 1 shows a control layout, using a pneumatic differential-pressure controller, two Rotam-

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eters, and a speed reducing gear and motor drive for the cleaning rake. The controller switch is set to open with decrease in pressure differential.

The drying section

The use of quick-acting electronic controllers for temperature control of a drying section has become widespread. Fig. 2 illustrates the use of an electronic temperature recorder-controller, actuated from thermocouples in the various cylinders. Through the use of a manual bypass it is possible to control temporarily by hand. After it has been decided from which thermocouple automatic control is desirable, the system is switched from manual to automatic, and the electronic instrument takes over. A diaphragm control valve in the steam supply regulates steam supply pressure to the cylinders. A main pressure regulator makes the steam independent of general pressure fluctuations in the mill. A welcome addition is a tachometer and paper break recorder, which produce chart records for speed and for lost time due to paper breaks. A steam flow meter records steam consumption. The use of pneumatic proportional plus reset (integral) control action for the temperature regulator avoids off-set or drift, thus securing close cylinder temperature control.

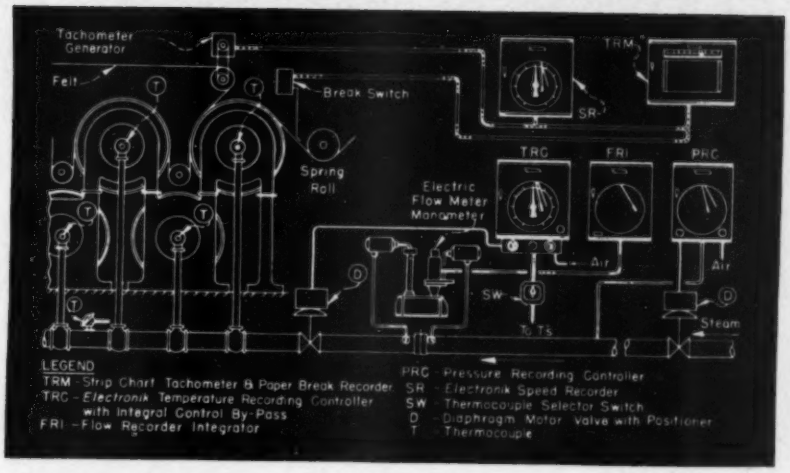


Fig. 2—Brown control instruments for paper dryer section

Bleach liquor

A typical bleach liquor instrumentation is shown in Fig. 3. Tank level indication is performed by indicators using the air bubble principle, while an electronic pH recorder-controller operates a diaphragm control valve regulating the amount of chlorine added to the liquor preparation tank. A flow type electrode immersed in a small vessel produces the electrical control impulse, which is transmitted to an indicating amplifier (not shown).

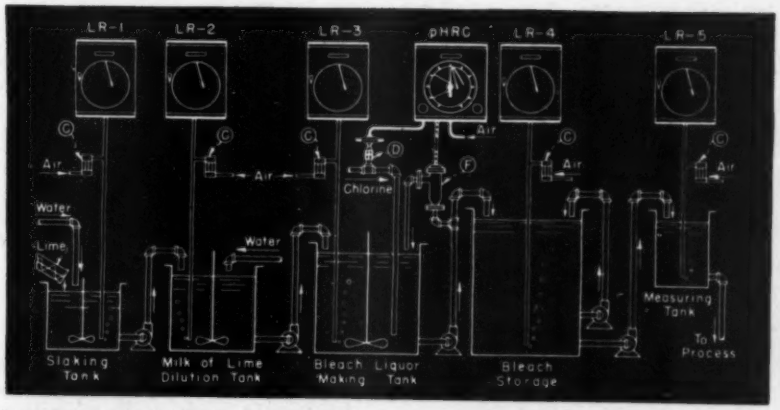


Fig. 3—Control of bleach liquor preparation system. pHRC-recording pH controller, LR-liquor level recorder, D-diaphragm control valve. F-flow type electrode for pH

In recent years, centralized control of multi-stage bleach plants has been developed, as illustrated in Fig. 4. Since bleach plants vary widely, both as to the number of stages used and the type of process equipment employed, it is impractical to attempt the design of a single complete system of instrumentation which will fulfill the requirements of any and all bleach plants. In the bleach plant, possibly more than in any other section of the mill, individually engineered instrumentation offers the only satisfactory solution to a complex measurement and control problem. Because of the widely separated locations of most of the processing equipment and flow control valves, a centrally located master control cubicle aids materially in the efficient operation of the plant and permits maximum utilization of the services of skilled operators. The control system, shown in part in Fig. 5, provides completely automatic control of process variables at many points throughout the plant as well as indication and record of all other pertinent variables.

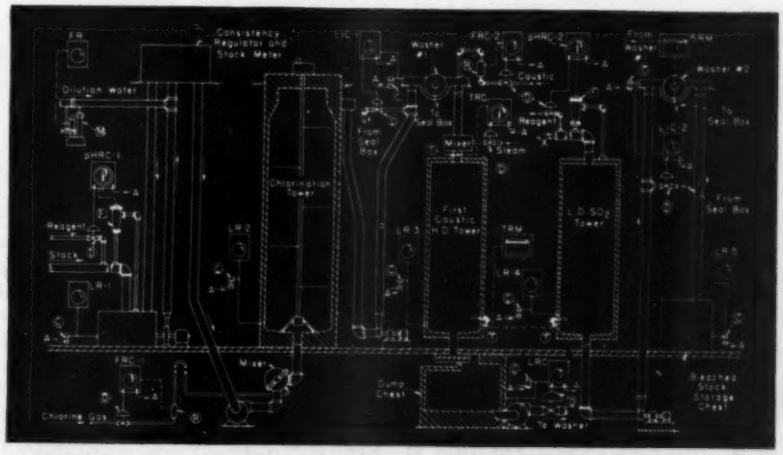


Fig. 4—Partial instrumentation of six-stage bleach plant using electronic control. A-air supply, D-diaphragm control valve, F-pH electrode, M-electronic meter body, R-Rota-meter transmitter, T-thermocouple, pHRC-recorder-controller for pH, LR-liquor level recorder, LIC-controller, FRC-recording electronic flow controller, LRC-level controller

In addition to the master cubicle on which is mounted the recording instruments, small console type cubicles are located adjacent to various pieces of process equipment. These cubicles supply

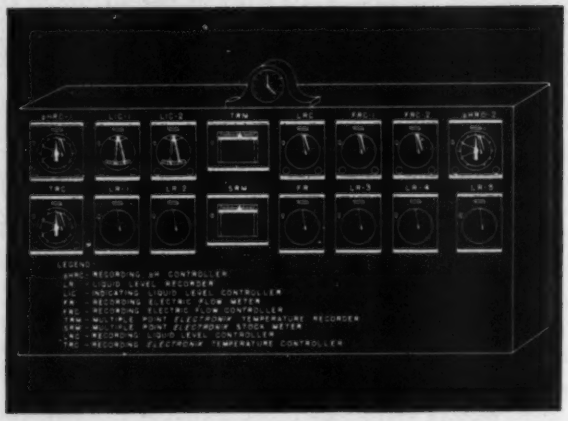


Fig. 5—Section of Brown master cubicle for six-stage bleach

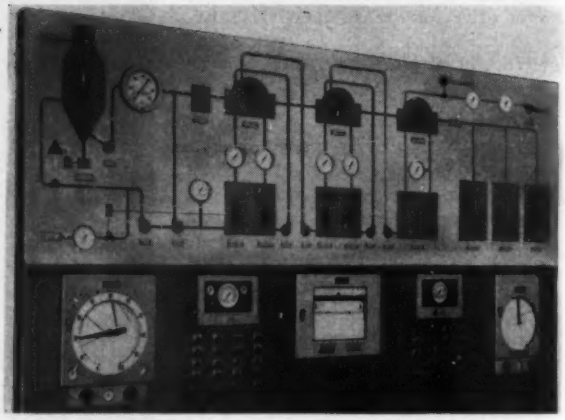


Fig. 6—Graphic panel designed for a paper mill

indication of pertinent variables and incorporate push buttons and signal lights which facilitate the operation of remotely located control valves. Not shown on the drawing is the instrumentation for three bleaching stages and that required for caustic storage, hypochlorite mixing and storage, flow control of caustic and hypochlorite, and steam pressure and flow.

Fig. 4 illustrates the application of instruments to several component parts of the bleach plant. As the stock enters the brown stock chest, its pH is continuously measured and automatically controlled. Level within the chest is continuously recorded. The stock passes on to the mixer, where another instrument measures and controls the rate of chlorine addition. Level within the chlorination tower is also continuously recorded. Level in the washer following the chlorination stage is indicated by an instrument which also functions as an automatic controller by operating a valve controlling the addition of dilution water. Another instrument enables the washer to function as a stock meter. Flow of caustic to the stock leaving the washer and temperature of stock leaving the mixer prior to entry into the first caustic high density tower are both automatically controlled.

Level within the first caustic high-density tower and temperature of stock leaving the tower are both continuously recorded. Level of stock in the tower dump chest is measured by an instrument which also controls automatically by throttling the output of the pump supplying No. 2 washer. The first hypochlorite, second caustic, and second hypochlorite towers, and their accompanying washers (not shown), employ instrumentation almost identical to that illustrated on the first caustic high-density tower. As the stock passes from the washer following the second hypochlorite tower, its pH is again measured and automatically controlled prior to its entry into the low-density SO_2 tower. Level of stock within this tower and temperature of stock leaving the tower are both continuously recorded. Another indicating type instrument measures level in the final washer and controls this level by regulating the flow of dilution water. This washer, as are all other washers in the plant, is equipped to function as a recording stock meter. Level of stock within the bleached stock storage is also recorded.

pH control

Continuous measurement and automatic control of pH play an important part in several phases of the bleaching operation. Automatic pH control of stock entering the brown stock chest and the low-density SO_2 tower and of hypochlorite in the mixing tank are typical examples. The primary measuring element, the electrode assembly, generates a voltage proportional to the pH of the measured medium. These assemblies are available in an immersion type for use in open tanks and vessels or a flow chamber type in which a continuous sample of the measured medium passes through a chamber containing the electrodes. The voltage generated by the electrodes passes to an amplifier and is measured by an ElectroniK instrument calibrated directly in pH units. The recorder is available with an electric or pneumatic control unit to automatically maintain pH at the desired level by regulating the amount of reagent added.

Marked decreases in installation time, as well as increases in process efficiency, are responsible for a constantly increasing trend towards the employment of completely assembled cubicles in the pulp and paper industry. These cubicles, both the console type and the master panel type, are completely assembled at the factory. All instruments, push buttons and signal lights are mounted in place, and all behind-the-panel wiring and piping is completed. Mill personnel need only set up the cubicles and make necessary connections to mill air and electric supplies and to the pertinent processes. These cubicles are engineered to meet the requirements of a specific mill and can readily be adapted to the design of a master control panel.

Graphic control panels

The latest progress in engineered plant control in the pulp and paper mill produced centralized control panels or cubicles built to suit the requirements of individual plants and processes. It is claimed by makers of graphic control panels that the graphic flow sheet, into which miniature instruments are inserted, makes supervision easier and requires less skilled process supervision. A control system of this type is illustrated in Fig. 6. On this type panel the processing equipment itself is reproduced in miniature so that the operator has before him a complete flow diagram which shows him the location of control valves, and the points where variables are being measured.

Instruments on the graphic panel control the consistency of the stock in the blow tank, level of liquor in first stage filtrate tank, and flow of shower water to the final washer. Other instaruments record a number of other process variables such as temperature, levels and flows by means of electronic instruments.

The panel is fully equipped with mounted instruments, push-buttons, signal lights and other control accessories on the custom-engineered panel, and complete back-of-panel wiring and piping. This feature results in two distinct benefits to the mill. In the first place, installation cost is sharply reduced, since the panel, when received at the mill, need only be set in place and connected to the process and to sources of electricity and compressed air. Secondly, mill personnel need not spend hours working with complex piping and wiring diagrams.

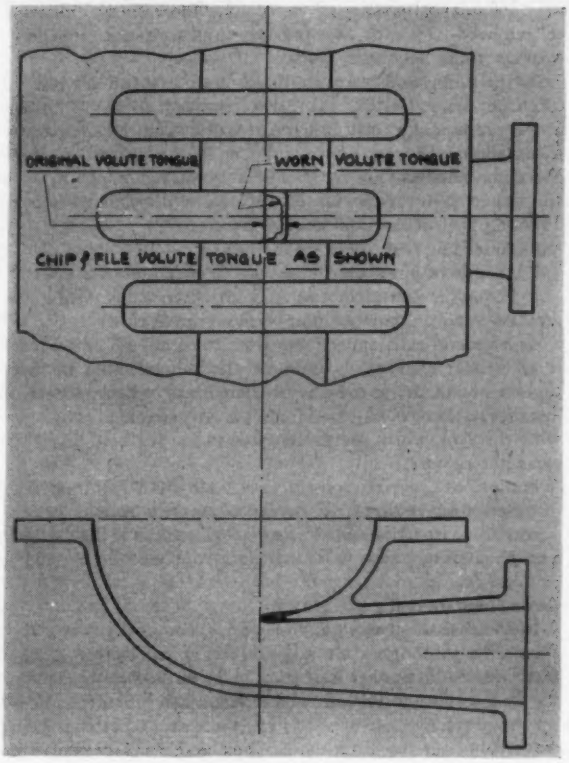


Fig. 1—Refinishing of volute tongue

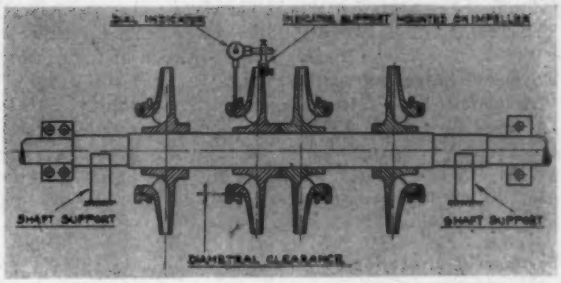


Fig. 2—Checking clearance of wearing rings with dial indicator

Centrifugal Pumps

Part 28 of a series

IGOR J. KARASSIK and ROY CARTER
Application Engineers, Worthington Corp.

Maintenance of centrifugal pumps (Section I)

WIDE VARIATION in types of centrifugal pumps, ranges in sizes, differences in materials of parts and, especially in design, necessarily restrict any comments on maintenance to those types of centrifugal pumps most commonly used. In the maintenance of all pumps, but especially of the more special types and designs, the manufacturer's instruction books should be carefully studied before any attempt is made to operate or service the pump. The amount of knowledge an operating engineer should have about the pumps in his care depends upon the demands of his system. In most cases complete information of the mechanical construction given in the instruction books, together with knowledge of the rated conditions of service (usually given on the pump nameplate) is sufficient. Occasionally, the proper operation and maintenance of the pumping equipment may require a more complete information of the pump characteristics, in which case a curve of each pump is required.

There is also considerable difference of opinion as to good practice in rebuilding certain worn pump parts such as wearing rings and shaft sleeves. As far as possible, procedures which have been successfully used are mentioned in these articles, even though some of these are not fully accepted as good practice.

The problems arising in connection with the proper maintenance of centrifugal pumping equipment vary from simple ones to those of a complex nature. The type of service for which the pump is intended, the general construction of the pump, the relative complexity of the required repairs, the facilities available at the site and other factors enter into the decision whether the necessary repairs will be carried out at the installation or at the pump manufacturer's plant. In a number of cases—especially when sufficient spare equipment is available—a pump in need of repairs is sent to the manufacturer's plant for complete overhauling. In other cases, repairs or overhauls are made locally by the mechanic servicing the installation. When expedient, service engineers from the pump manufacturer's plant execute repairs at the site.

Daily observation of pump operation

In a station where operators are on constant duty, hourly and daily inspections should be made. While it is felt that a card record system is unnecessary for these inspections, the operator should be on the watch for irregularities in the operation of a pump and report these immediately. A change in the sound of a running pump should be investigated immediately. Bearing temperatures should be observed hourly. An abrupt change in bearing temperature is much more indicative of trouble than a constant high temperature. If the pump is fitted with ring-oiled bearings, the proper functioning of the oil-rings should be observed.

Material from this article will be included in a book on centrifugal pumps now being prepared by the authors; hence, all rights to republications are reserved by the authors.

Stuffing box operation should likewise be observed hourly. The stuffing box leakage should be checked to see whether it is sufficient to provide cooling and lubrication of the packing but not excessive and wasteful.

A check of the pressure gauges and flow indicator, if these are installed, should also be made hourly to see that proper operation is being maintained. If recording instruments are available, a daily check should be made to insure that the capacity output, pressure, or power consumption do not indicate that something needs attention.

Semiannual inspection

It is good practice semiannually to check for free movement of the stuffing box gland, to clean and oil the gland bolts and nuts and to inspect to see if the packing should be replaced.

The pump and driver alignment should be checked and corrected if necessary. Oil-lubricated bearings should be drained and refilled with fresh oil. Grease-lubricated bearings should be checked to see if correct amount of grease is provided and that it is still of suitable consistency.

Annual inspection

A very thorough inspection should be made of a centrifugal pump once a year. In addition to the semiannual procedure, the bearings should be removed, cleaned and examined for flaws. The bearing housings should be carefully cleaned. Anti-friction bearings should be examined for scratches and wear after cleaning. Care should be taken that dirt or moisture do not get into an anti-friction bearing and, immediately after inspection, such a bearing should be coated with oil or grease.

The packing should be removed and the shaft sleeves—or shaft, if no sleeves are used—should be examined for wear.

The coupling halves should be disconnected and alignment checked. In the case of horizontal pumps with babbitt bearings, the vertical shaft movement for both ends should be checked with the packing out and the coupling disconnected. Any vertical movement over 150 per cent of the original play requires an investigation to determine the cause. The end-play allowed by the bearings should also be checked and, if it is in excess of that recommended by the manufacturer, the cause should be determined and corrected.

Drains, sealing water piping, cooling water piping, etc., should be checked and flushed. If an oil cooler is used, it should be flushed and cleaned.

The pump stuffing boxes should be repacked and the coupling reconnected.

If instrument and metering devices are available, these should be recalibrated, and a test should first be made to determine whether proper performance is being obtained. If internal repairs are made, the pump should again be tested after completion of the repairs.

Complete overhaul

The frequency of a complete overhaul depends upon the hours of operation of the pump, the type of liquid being pumped, the type and materials of pump construction and its general care.

In some extremely severe services, a complete overhaul may be needed every month, but on others it may be only necessary to do this every two or three years or even at less frequent intervals. The frequency of a complete overhaul must therefore be determined more by experience than by any other means.

Great care should be exercised in the dismantling operation. Close suction and discharge valves and drain the pump casing. Take apart all necessary piping and parts which would interfere with the disassembly of the pump, such as bearing covers, etc., as may be required in accordance with the manufacturer's instructions.

In the case of axially split casing pumps, after the dowels and the nuts of the casing bolts have been removed, the upper half of the casing should be lifted straight up, so as not to damage the internal parts. The rotor should likewise be removed vertically, to prevent injury to the impellers, wearing rings and other parts.

As the pump and rotor are dismantled, precaution must be taken to mark the various parts removed so as to insure proper reassembly. All individual parts and all important joints should be carefully examined. If the pump has been operating satisfactorily with only a slight reduction in head and capacity due to increased leakage, a decision on reconditioning will depend on several factors:

1. Availability of spare parts.
2. Length of time the pump can be left out of service.
3. Economic considerations and importance of getting the greatest service from the unit without overhauls.

As a general rule, appreciably worn parts should be renewed if it is not intended to examine the pump until the next routine period. It must be remembered that when parts with metal seats in new or good condition are assembled in contact with dirty or worn parts, the new parts are very likely to wear out rapidly.

Pumps of special construction and built of materials intended to give long uninterrupted service should not be opened for inspection unless there is evidence that the capacity has fallen off or unless noise indicates trouble inside the pump.

Casing maintenance

In the case of general service pumps, the casing waterways should be thoroughly cleaned and repainted during a complete overhaul. Special care should be exercised to examine the casing for corrosion, which frequently manifests itself by the graphitization of cast iron, the ferrous particles being washed out due to electrolytic action and being deposited on the bronze pump parts. If severe graphitization takes place, the manufacturer should be consulted on the possibility of substituting materials which would be more impervious to the characteristics of the pumped liquid.

If the casing is pitted or eroded in places, it is often possible to restore it by welding, brazing, silver soldering or metal spraying, depending upon the material of the casing and the facilities available. Special care should be taken to examine and recondition the metal-to-metal fits where stationary parts such as casing rings, diffusers, or stage pieces seat in the casing. If the latter is made of steel, and these fits show signs of erosion, it might be advantageous to face them with 18-8 stainless steel and refinish. Attention should also be paid to cut-water or tongue in the volute casing. When it is worn unevenly, it should be cut back and trimmed as shown in Fig. 1. In some cases, it may prove practical to build up the volute tongue to its original dimensions by welding. The vane tips of diffusers generally cannot be built up by welding as in the case of a volute casing, and they should be trimmed evenly if worn.

Care should be taken not to distort or warp the casing during the overhaul, and, after repairs are completed, the horizontal flanges of an axially split casing should be finished to a flat surface with hand tools. Of course, if the repairs are of a very serious nature, they are carried out at the shop of the manufacturer at which time the casing flanges may have to be refinished and the casing rebored.

Except for some very special designs, every pump has gaskets which may be damaged when a pump is opened, and a new gasket should be available for replacement if needed. If the old gasket adheres to the lower half of the casing and is in good condition, it is not necessary to replace it. It should be replaced, however, if damaged in any way. The new gasket should be of the same thickness as the original one and, as much as possible, of the same type of material so that it will compress to the same extent. Too thick a gasket will generally lend to casing cutting through leakage; if the gasket is thinner than the original one, tightening the two casing halves may exert undue force on the casing wearing

rings and distort them. This, in turn, may lead to contact with rotating parts and severe damage.

In installing a new gasket, the inner edge must be accurately trimmed along the edge of the stuffing box bore. At all points where the gasket abuts on the outer diameter and sides of stationary parts, the edges must be trimmed squarely and neatly—sufficiently overlaapping that the upper half of casing when being tightened will effectively press the edges of the gasket against the stator-parts, insuring proper sealing. This trimming operation is most satisfactorily accomplished by first cementing the gasket to the lower half of the casing with shellac, thereafter cutting all edges square, using a razor blade. Of course, all foreign matter must be removed from the casing flanges before applying the gasket to the lower casing half.

It is recommended that powdered graphite be rubbed into the gasket before replacing the top casing half in reassembling the pump. This will prevent the gasket from sticking to the upper half when it is again removed.

Wearing ring maintenance

In some cases, the wearing ring clearnces may be measured by inserting a feeler gauge between the stationary and rotating parts. If the wearing ring construction is of the L-type and the lip of the L prevents the insertion of the gauge, an approximate check of the clearance may be made in the following manner without dismantling the rotor (this operation, however, is best carried out with the rotor removed from the pump casing):

1. Mount a dial indicator on the impeller (see Fig. 2) and, with the stationary ring resting on the impeller wearing ring hub, set the dial reading to zero.

2. Without removing the impeller or dial indicator, push up on the stationary ring from below and record the maximum dial reading. This corresponds to the diametral clearance.

The method described above is most applicable to multi-stage pumps. In the case of single-stage pumps, once the rotor is out of the casing, the stationary rings may be freely removed and the clearance determined by measuring the two diameters and calculating the difference. In general, even if the clearance is not excessive and the pump may be reassembled without renewing the wearing ring joint, it may be advisable to check the hub diameter of the impeller and the inside diameter of the stationary wearing ring for eccentricity of wear.

The permissible amount of wear in the wearing ring clearances before the parts need to be renewed depends upon a great number of factors, such as the pressure developed per stage, the excess margin in the pump capacity over the actual maximum requirements, etc. As a general rule with water pumps, an increase of 0.010 to 0.015 in. in the diameter clearance would warrant renewal of the wearing surface, because it becomes more economical to carry out this repair than to pay for the power lost through excessive leakage.

Recommended clearances when refitting wearing rings are shown in Fig. 3. These clearances are given basically for single-stage pumps with either single or double flat rings, assuming that the materials of the two parts making the joint do not gall easily. They apply, therefore, to the combination of bronze with a dissimilar bronze, cast iron with bronze, steel with bronze, Monel metal with bronze, and cast iron with cast iron.

These clearances should be increased approximately 20 per cent for combinations of materials which may gall, such as, steel with steel, stainless steel with stainless steel, Monel metal with Monel metal, and Monel metal with stainless steel.

For two- and three-stage single casing pumps, increase clearances 0.002 in., and for four- to six-stage single casing pumps increase the diametral clearance by 0.003 in. The tolerance indicated is plus (+) for the casing ring and (−) for the impeller hub (or ring).

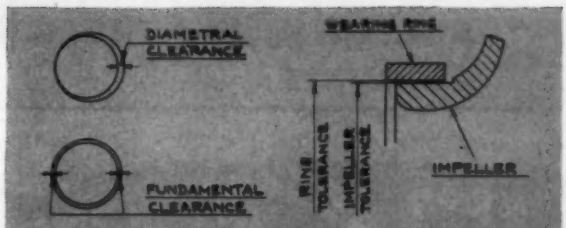


TABLE FOR 2 AND 3 STAGE PUMPS WITH BRONZE WEAR RINGS

RANGE DIA	TOLERANCE RANGE RING	TOLERANCE RANGE IMP.	FUNDAMENTAL CLEARANCE	DIAMETRAL CLEARANCE	RANGE FOR DIAMETRAL CLEARANCE
2 TO 3½	+.002" −.000"	+.000" −.002"	.006"	.012"	.012 TO .016"
4 TO 5½	+.002" −.000"	+.000" −.002"	.007"	.014"	.014 TO .018"
6 TO 7½	+.002" −.000"	+.000" −.002"	.008"	.016"	.016 TO .020"

ILLUSTRATIVE USE OF CLEARANCE TABLE

RING TOLERANCE OR BORE, FOR EXAMPLE: 6.000 +.002 −.000 BORE

IMPELLER TOLERANCE OR TURN = DIA MINUS TWICE THE FUNDAMENTAL CLEARANCE PLUS IMPELLER TOLERANCE.

FOR EXAMPLE: 6 DIA − .016 = 5.984 + IMP. TOL. = 5.984 +.000 −.002 TURN

NOTE: FOR STAINLESS STEEL INCREASE FUNDAMENTAL CLEARANCES BY .002

Fig. 3—Wearing ring clearance chart

There are three methods feasible in restoring the wearing ring clearance of a pump with single flat or L-type ring construction.

1. Obtain a new casing ring bored undersize from the manufacturer and true up the wearing ring hub of the impeller by turning down in a lathe.

2. Build up the worn surface of the wearing ring by welding or metal spraying, so that it can be bored undersize, and true up the wearing ring hub of the impeller as above.

3. True up wearing ring by boring oversize, build up the wearing ring hub of the impeller and machine to give correct clearance with rebored ring.

Methods (2) and (3) are difficult to do successfully and are only feasible in the case of larger pumps and if equipment is available so the work can be done on the premises. Usually, building up the wearing ring hub of the impeller by welding is very difficult and, in case the wearing surfaces are to be so restored, a pump with double ring construction would be preferred. Method (1) is generally the best procedure.

If the pump is provided with double flat or L-type wearing rings, the clearances may be renewed by one of the following methods:

1. Obtain new oversize impeller ring and use old casing ring bored out larger.

2. Obtain new casing ring bored undersize and use old impeller ring turned down.

3. Renew both rings if necessary.

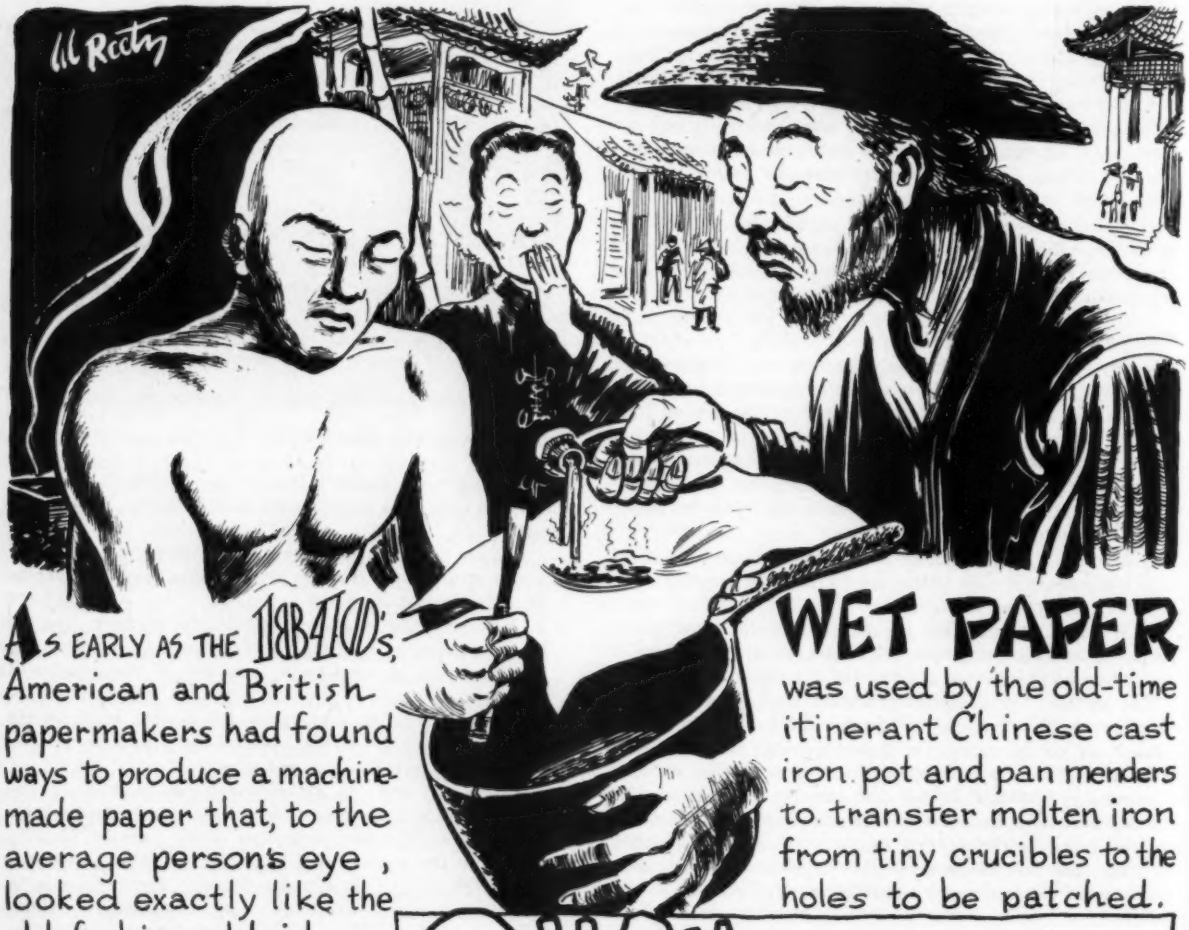
4. Build up either the casing or impeller ring by welding or metal spraying, machining the other. By altering the ring build-up, the original leakage joint diameter can be closely maintained.

The comments as to the relative merits of these various methods given for single ring construction pumps apply to double ring construction as well.

Labyrinth ring constructions generally employ double rings, with the impeller ring screwed onto the impeller. If excessive clearance develops, replacement of the rings is advisable in most cases.

After a new impeller ring has been mounted on an impeller, it is often found that the wearing ring surface is not concentric with the axis of the shaft. It is therefore advisable after mounting a new ring, to check the wearing surface, machining if necessary. This should be done whether the impeller ring is pressed-on, bolted-on, or screwed on the impeller.

PAPER SKETCHES



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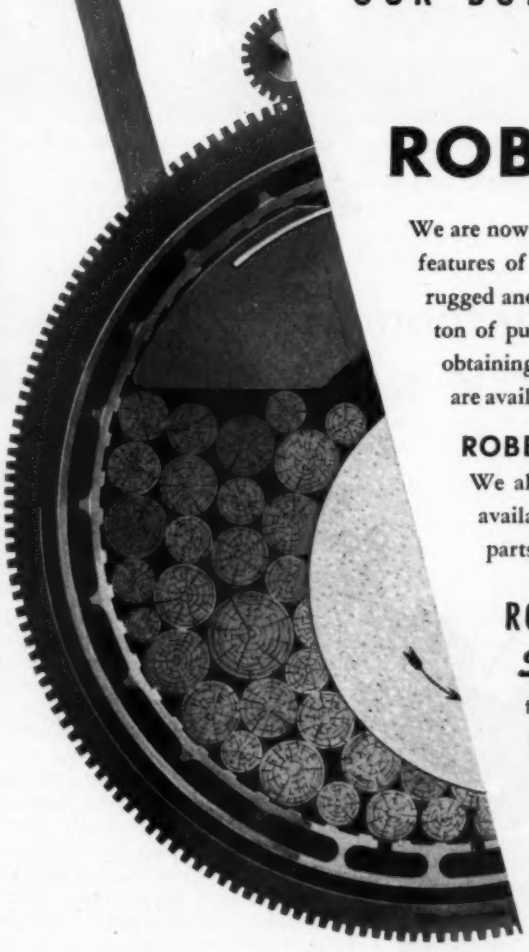

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EDWARD BENTON FRITZ trophy went to Ecusta Paper Corp. for safe operations in 1952; H. E. Newbury, Ecusta safety director (1), is seen here with A. Scott Dowd, president of Fritz Publications, donor of the annual award at the Congress

ARTHUR HOYT SCOTT award trophy is displayed by James N. Conaway, safety manager for Scott Paper Co. at Chester, Pa.; the bowl will be presented at the 1954 Congress to the firm with the best safety record in all its operations

Safety a fundamental part of production, Everest tells 41st National Safety Congress

Ecusta Paper Corp. wins Edward Benton Fritz Memorial Trophy . . . more than 200 attend pulp and paper sessions . . . steady accident reduction cheered by delegates . . . latest safe practices described by mill representatives

SHARING IDEAS AND IDEALS for safety was the purpose of more than 200 pulp and paper industry representatives who attended the 41st National Safety Congress in Chicago October 19-23. The Congress, attended by an estimated 12,000 men and women from all industry, is sponsored each year by the National Safety Council in the interest of accident prevention at home, at work, and at play.

Winner of the 1953 Edward Benton Fritz Memorial Trophy for the best overall achievement in the NSC Paper Industry safety contest for 1952 was Ecusta Paper Corp. at Pisgah Forest, N.C. The announcement was made at the annual business session by A. Scott Dowd, president of Fritz Publications Inc. THE PAPER INDUSTRY sponsors the yearly award. The trophy was accepted for Ecusta by H. E. Newbury, safety supervisor.

Among officers elected to serve the Pulp and Paper Section for the 1953-54 year were: General chairman—Arthur Carle, safety director for the Northwest Paper Co., Cloquet, Minn.; vice chairman and program chairman—Dallas E. Henry, safety coordinator for Southern Advance Bag & Paper Co., Hodge, La.; news letter editor—Francis H. Wagner, director of Safety, the Mead Corp., Chillicothe, Ohio, and secretary and membership chairman—Fred O. Soughton, service and safety supervisor for LongLac Pulp & Paper Co. Ltd., Terrace Bay, Ont.

General Chairman Arthur Carle succeeds A. E. Minor, safety supervisor for Ontario-Minnesota Pulp & Paper Co. Ltd., Kenora, Ont.

Safety an everlasting job

"We are doing a pretty good job in accident prevention, but much remains to be done. The great majority of management in our industry has long been safety wise; but there still are some who need to be enlightened."

ARTHUR CARLE of Northwest Paper is 1953-54 section chairman

This was the view expressed by D. Clark Everest, chairman of the board of Marathon Corp., Rothschild, Wis., as he addressed the business session. Mr. Everest was a delegate to the Milwaukee meeting 41 years ago at which time the National Safety Council was formed, and was instrumental in establishing the Pulp and Paper Section in 1915.

"After more than 40 years, the movement is well on its way," Mr. Everest declared, "but it is one of those things in which you cannot let down in your efforts for one moment. . . . With the greatest number of employed people in the history of the country and with the continuous introduction of new people into industry, it makes it imperative that you keep everlastingly at the job of maintaining these safety programs."

Steady improvement

In presenting the grand prize to Ecusta, Mr. Dowd, who is chairman of the contest committee, summarized the 1952 statistics. The total exposure reported by all contestants was 482,718,000 man-hours, covering approximately 241,000 employees in pulp mills, paper and

UNDER THE JUNIPER TREE was the title of an address given at the annual luncheon by Jimmy Arrington, mayor of Collins, Miss.; "It used to be," he said, "that men carried their problems in their heart, now they carry their troubles in a brief case." Mr. Arrington, a lawyer, is a newspaper editor and publisher

HEAD TABLE at the annual luncheon (l to r): F. G. Pater, NSC staff representative (standing); Dallas Henry of Southern Advance Bag & Paper; A. E. Minor, Ontario-Minnesota Pulp & Paper; Mrs. Arthur Carle; R. W. Gray, Union Bag & Paper; Jimmy Arrington; Arthur Carle of Northwest Paper, and F. O. Soughton, LongLac Pulp & Paper

VALUES OF A SAFETY program were discussed at the second general session; participants were (l to r) Francis H. Wagner and Donald O. Collins of Mead Corp.; Elmer Collar and E. A. Page of Kimberly-Clark, and Chester Matzenger Jr. and Earl Nargis of International

YEARLY GATHERING of representatives of Kimberly-Clark Corp. and affiliated operations; totaling 34 in all, one of the principal topics of those attending the NSC from K-C was the possibility of including woodlands in the Council's program

paperboard mills, and paper products plants.

The cumulative frequency rate for all contestants was 9.32, about 5 per cent lower than the final rate of the 1951 contest. This rate was also 7 per cent below the national average of 10.06 for all companies in the industry that reported to the NSC in 1952.

A total of 255 contestants—or 58 per cent of the total enrollment—had frequency rates below 10. Forty-three units, consisting of 23 mills and 20 converting plants, completed the contest with perfect scores. Additionally, there were 116 plants—aside from group winners—that had frequency rates below their group averages. These plants also showed reductions by comparison with those made in the previous contest.

Arthur Hoyt Scott award

The business meeting of the Pulp and Paper Section featured the formal acceptance of the Arthur Hoyt Scott award, a silver bowl donated by Scott Paper Co. of Chester, Pa. The trophy will be given in addition to the regular NSC awards and the Edward Benton Fritz trophy.

It will be presented at the 1954 National Safety Congress to that company whose operations *in all its plants combined* result in the best safety record during the 1953 contest period. The experience must cover a minimum exposure of 3,000,000 man-hours, which may include experience in the period immediately preceding this year's contest; this to make up the required minimum exposure.

The Arthur Hoyt Scott award will be made annually, with the winning company taking permanent possession of a commensurate plaque and holding the silver bowl for one year. Any firm winning the award three times will take permanent possession of the trophy.

Chairman's report

That 1952-53 was "not a spectacular year" was the view expressed by A. E. Minor, retiring section chairman. But, he said, "we did move steadily forward."

As of June 30, 1953, Mr. Minor declared in his annual report, the section had 327 member firms. During the year 12 companies joined the section, while five withdrew. In reviewing the work of the group during the past year, he called specific attention to the appointment of F. G. Pater as the official NSC staff representative.

The purposes of safety

At the second general session three representatives of various levels of employment discussed the things they expect to receive from a well-run safety program.

Elmer Collar, an hourly worker at the Neenah, Wis., mill of Kimberly-Clark Corp., opened the discussion. The worker at K-C, he declared, has done much to further the success of the safety program.

"If the foreman while working among his men shows he is sincere in safety," Mr. Collar said, "the worker is bound to go along in a good safe way in all his work." He stressed the importance of first aid, pointing to the following areas of special importance: eyes, feet, face.

The foreman's viewpoint was expressed by Earl D. Hargis, pulp mill tour foreman for International Paper Co. at Bastrop, La. "A foreman cannot carry out a single-handed safety program," he declared. "He can instill in his men the necessity of safe thinking and train and teach them the methods of

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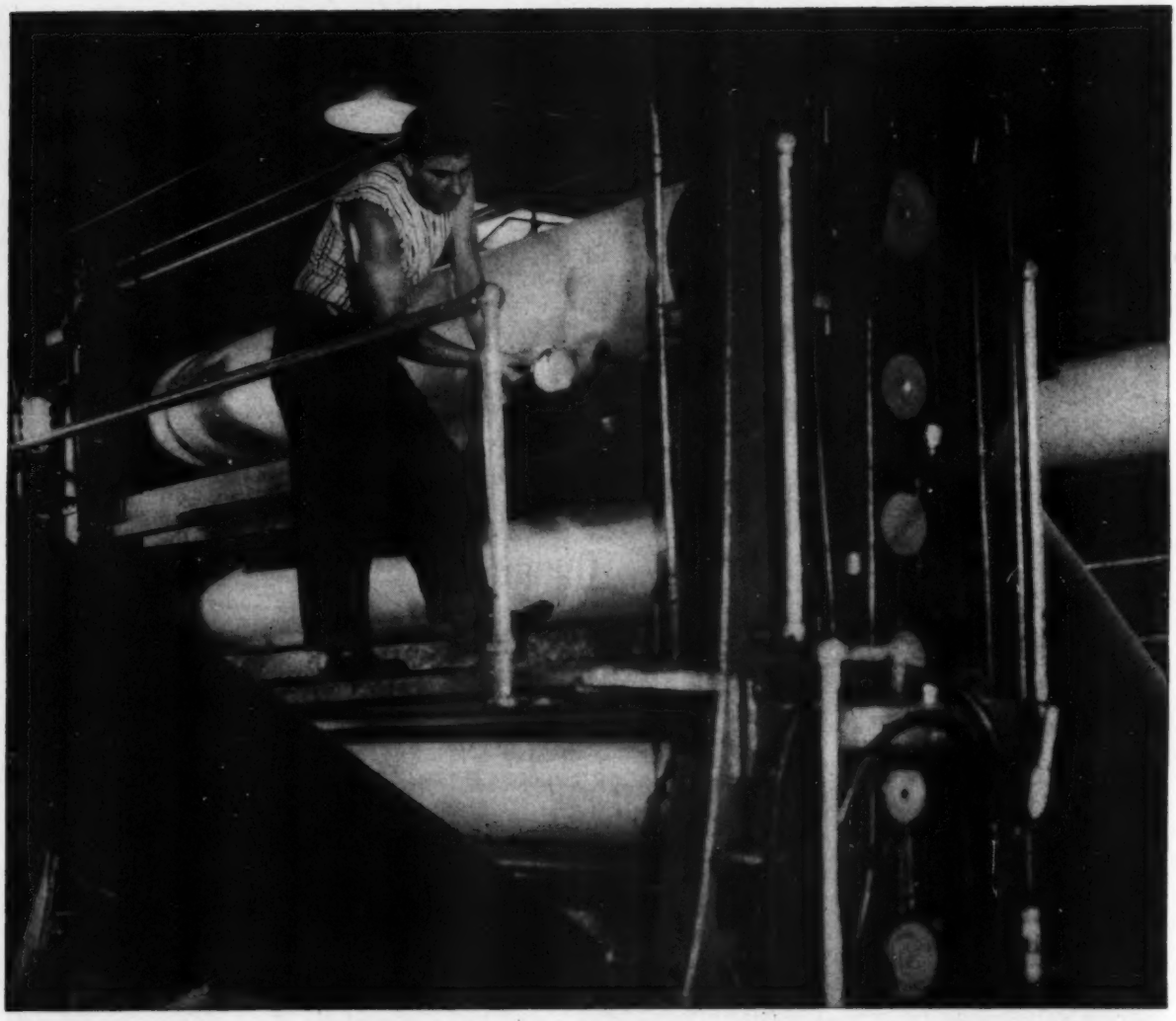

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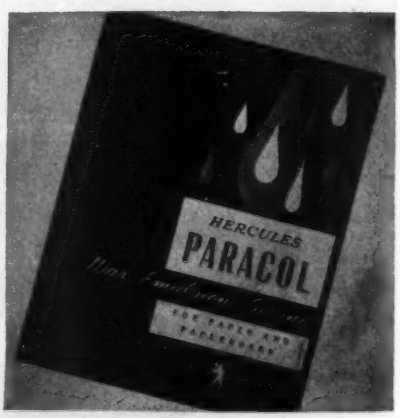

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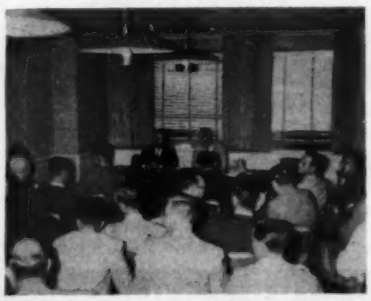
SULFATE pulp manufacturing; F. O. Soughton presiding, Marion L. Hodges, recorder

PULPWOOD logging discussion; H. H. Jefferson presiding, R. C. Hammond conference recorder



PAPER converting session; Vincent P. Coulon in charge, Hugh M. Jackson, recorder

INSULATION products round table; Amos S. Keen presiding, A. W. Smith, conference recorder

FOLDING paper box session; A. O. Vranek presiding, Earl F. Ripstra, conference recorder

safe performance of their duties, but that is not all there is to a safety program.

"A safety program is not departmental, but plant-wide," he continued. "What a foreman expects of a safety program can follow the same lines as followed in production. If in any part of his department an unsafe condition exists that he himself cannot correct, he will report it to the proper departments and will expect the same service that he would receive if the problem were directly connected with production."

Regarding his relation with the safety department and safety supervisor, Mr. Hargis declared that the foreman wants to be kept well-informed at all times. With knowledge of what is going on safety-wise, he is well on his way toward success in his job.

Moral responsibility

"The superintendent has a definite moral responsibility for the safety of the men working under his supervision," according to Donald O. Collins, assistant superintendent of No. 1 paper mill of the Mead Corp., Chillicothe, Ohio. Mr. Collins, speaking on the subject "What a Superintendent Expects of a Safety Program," concluded the second general session.

". . . You might be led to assume," he declared, "that the superintendent expects a gerat deal from the safety program. Truthfully, he does. . . . First of all, we should consider the importance of having a well-rounded and sound safety program—instituted, supported and sustained by top management." In order to accomplish this, the speaker explained, the superintendent expects quite a lot of help from various people and departments.

The section's formal program was concluded with the annual luncheon, at which time Jimmy Arrington, mayor of Collins, Miss., spoke on the subject, "Under the Juniper Tree."

On two afternoons seven round tables were staged to bring to the delegates the latest in safety procedures and methods. Various paper mill and converting problems were stated and discussed. The subjects were: Sulfite Pulp Manufacturing, Sulfate Pulp Manufacturing, Pulpwood Logging, Paper Manufacturing, Paper Converting, Insulation Products, and Folding Paper Boxes.

GENERAL session personalities included (l to r) R. M. Altman of Marathon's production services department; D. C. Everest, Marathon board chairman; A. E. Minor, retiring section chairman, and Arthur Carle, new chairman

Executive committee organization

The structure of the 1953-54 paper section executive committee, in addition to the officers listed above, is as follows:

Regional Membership Representatives—*Great Lakes:* E. A. Page, safety supervisor, Kimberly-Clark Corp., Neenah, Wis.; *East:* H. P. Heubner, insurance manager, The Flintkote Co., New York, N.Y.; *South:* C. C. MacPike, safety director, St. Regis Paper Co., Pensacola, Fla.; *West:* Otto Hartwig of Crown Zellerbach Corp., San Francisco, and *Canada:* Douglas B. Chant, secretary-engineer, Ontario Pulp & Paper Makers' Safety Association, Toronto.

Medical Advisor—Dr. James D. Stark, medical director, Hammermill Paper Co., Erie, Pa.

Statistical Committee—Gordon Lemke, research engineer, Employers Mutual Liability Insurance Co., Wausau, Wis. (chairman); Lambert Louy, safety director, Container Corp. of America, Chicago, Ill.; George R. Merriman, coordinator of personnel and safety, International Paper Co., Mobile, Ala.; W. H. McLaughlin, director of safety and sanitation, Lily-Tulip Cup Corp., College Point, L.I., N.Y., and R. W. Croucher, safety officer, Minnesota & Ontario Paper Co., International Falls, Minn.

Contest Committee—A. Scott Dowd, president, Fritz Publications, Inc., Chicago,

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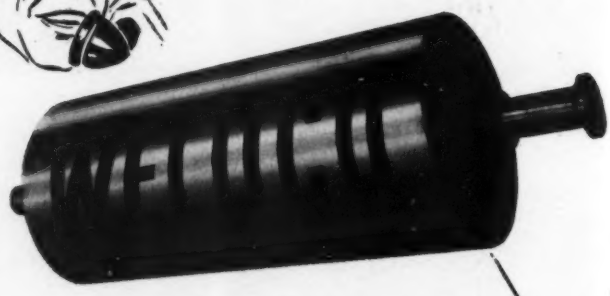

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Ill. (chairman); J. Fred Berry, general insurance manager, Alton Box Board Co., Alton, Ill.; Harley B. Goodrich, maintenance and safety engineer, Strathmore Paper Co., West Springfield, Mass., and James N. Conaway, safety manager, Scott Paper Co., Chester, Pa.

Pulpwood Logging Division — Chairman, John E. Schueler, safety engineer, Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.

Publications Committee: Russell C. Hammond, safety engineer, Employees' Mutual Liability Insurance Co. of Wisconsin, Ironwood, Mich. (chairman); Harry H. Jefferson, training officer, American Pulpwood Association, New York, N.Y.; G. K. Eoll, personnel manager, Marathon Paper Mills of Canada, Ltd., Port Arthur, Ont., and Walter Lockheart, safety supervisor, Woodlands Department, LongLac Pulp & Paper Co., Terrace Bay, Ont.

Visual Aids Committee: B. H. Roy, supervisor of health and safety, woodlands, Spruce Falls Power & Paper Co., Kapuskasing, Ont. (chairman); R. T. Carter, Abitibi Power & Paper Co. Ltd., Toronto; J. C. Rodgerson, plant safety supervisor, Brown Co., Berlin, N.H., and David W. Sowers Jr., research forester for West Virginia Pulp & Paper Co., Hancock, Md.

Pulp Manufacturing Division—Chairman, D. V. Hill, safety director, The Mead Corp., Kingsport, Tenn.

Publications Committee: Fred T. Morrish, safety supervisor, The Ontario-Minnesota Pulp & Paper Co. Ltd., Fort Frances, Ont. (chairman); Russell Bell, safety director, Crossett Companies, Crossett, Ark.; N. C. Bellamy Jr., safety supervisor, Carolina Division, Champion Paper & Fibre Co., Canton, N.C., and C. C. Coughlin, safety director, Gulf States Paper Corp., Tuscaloosa, Ala.

Visual Aids Committee: Marion L. Hodges, safety director, West Virginia Pulp & Paper Co., North Charleston, S.C. (chairman); E. J. Marquardt, safety director, National Container Corp., Tomahawk, Wis.; George S. Nelson, claims and safety manager, Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis., and Charles R. Hagan, safety manager, Oxford Paper Co., Rumford, Me.

Paper Manufacturing Division—Chairman, C. R. Johnston, personnel and safety director, Cornell Paperboard Products Co., Cornell, Wis.

Publications Committee: R. B. Welch, safety supervisor, P. H. Glatfelter Co., Spring Grove, Pa. (chairman); Robert K. Meredith, safety director, West Virginia Pulp & Paper Co., Tyrone, Pa.; Otto Sherman, safety supervisor, Mill Division, Gaylord Container Corp., Bogalusa, La., and E. A. Topmiller, supervisor of safety, Champion Paper & Fibre Co., Hamilton, Ohio.

Visual Aids Committee: Robert J. Gell, staff assistant, Paper Mill Division, Eastman Kodak Co., Rochester, N.Y. (chairman); William A. Oliver, safety supervisor, Gardner Board & Carton Co., Middletown, Ohio; V. C. Gault, general safety supervisor, Crown Zellerbach Corp., Portland, Ore.; Robert M. Gilmore, general safety supervisor, Rayonier Inc., Hoquiam, Wash., and William VanHout, safety coordinator, Kimberly-Clark Corp., Kimberly, Wis.

Paper Converting Division — Chairman, Robert W. Gray, safety director, Union Bag & Paper Corp., Savannah, Ga.

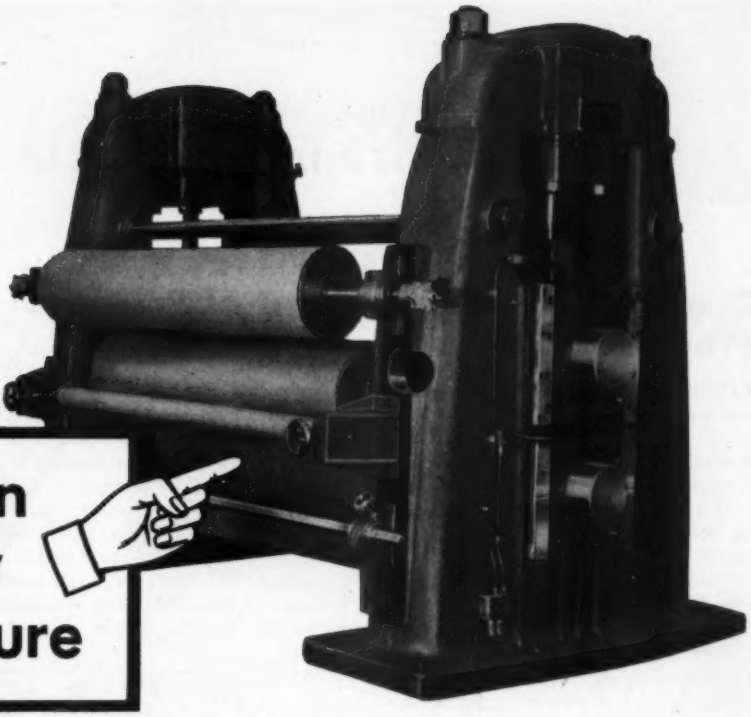
Bag Manufacturing Committee: R. G. Belknap, personnel manager, Bemis Bros. Bag Co., East Pepperell, Mass. (chairman); Martin Maney, director of training, St. Regis Paper Co., Pensacola, Fla., and Harold Hewitt, assistant personnel manager, Bemis Bros. Bag Co., Peoria, Ill.

Box Manufacturing Committee: A. O. Vranek, safety director, Container Corp. of America, Chicago, Ill. (chairman); G. J. Bienvenu, general superintendent, Container Division, Gaylord Container Corp., Bogalusa, La.; Ray Ketchmark, director of safety and labor relations, Folding Paper Box Association of America, Chicago, Ill., and Forrest E. Kimmell, safety director, Sutherland Paper Co., Kalamazoo, Mich.

Roofing Manufacturing Committee: Carl L. Eddins, assistant insurance manager, The Flintkote Co., New York, N.Y. (chairman); Hugh Jackson, manager of safety and training, Johns-Manville Corp., New York, N.Y.; Thomas Tobin, assistant safety director, Lloyd A. Fry Roofing Co., Summit, Ill., and A. W. Smith, personnel and services manager, Bird & Son inc., East Walpole, Mass.

Insulation Manufacturing Committee: Amos S. Kean, safety director, Armstrong Cork Co., Lancaster Pa. (chairman); Russell Blum, safety director, The Flintkote Co., Meridian, Miss., and Budwin J. Lee, safety director, Wood Conversion Co., Cloquet, Minn.

Specialties Manufacturing Committee: Vincent P. Coulon, safety director, The Sealright Co. Inc., Fulton, N.Y. (chairman); A. J. Homblette, safety supervisor, Kimberly-Clark Corp., Neenah, Wis., and Robert Sassman, safety director, Dixie Cup Co., Easton, Pa.



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They cool hydraulic fluid to prevent loss of pump capacity. Thus, required roll pressures are assured! They keep lube oil temperatures at most effective levels. Bearings are thereby safeguarded.

Custom builder of pulp and paper mill machines, Appleton Machine Company also furnishes Ross Exchangers as components of winders, grinders, rewinders, machine and super calenders. In fact, Ross Exchangers are regularly utilized throughout the paper industry on many makes of engines, centrifugal pumps, compressors, drying machines, continuous beaters and fourdrinier sections.

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The Paper Industry Association News

Growth and Development of Pulping Processes Discussed at Ohio Tappi

RECENT DEVELOPMENTS in pulping methods in use throughout the country were highlighted at the October 8 meeting of the Ohio Section of Tappi. Speakers at the gathering, which was held at Middletown, were Dr. John N. McGovern, chemical engineer at the Forest Products Laboratory, and Dr. Harold Bialkowski, research director of the Pulp Division of Weyerhaeuser Timber Co.

Predicting a great future for semichemical pulping, Dr. McGovern presented a brief history of the process—from the Mitscherlich patent in 1874 to the 1953 development by The Champion Paper & Fibre Co. whereby bleached semichemical pulp is produced with a continuous digester.

Comparing the present tonnages of the various pulp grades, Dr. McGovern pointed out that semichemical is now one of the big four. The ranking is as follows, with yearly tonnages in parentheses: Sulfate (9,560,000); groundwood (2,970,000); sulfite (2,650,000); semichemical (1,230,000); dissolving (720,000); soda (470,000), and miscellaneous (1,460,000). The tabulation shows the growth of the process as follows:

	Board Mills		Paper Mills		Total
		Tons		Tons	Tons
Year	No.	day	No.	day	day
1925	1	10	—	—	10
1930	5	320	1	35	355
1940	7	415	1	50	465
1945	10	925	—	—	925
1947	12	1490	—	—	1490
1948	15	1955	3	80	2035
1953	122	3190	10	395	3585

Any pulping process can be used for semichemical pulping, the speaker continued. However, sodium sulfite has proved the most popular to date. The cooking liquor is buffered with sodium carbonate or bicarbonate to give a pH slightly above neutral, and hence the name neutral sulfite semichemical has been applied to the process.

Following a brief summary of the more technical aspects of the semichemical pulping process and the strength properties of the product, Dr. McGovern discussed the possible future uses for semichemical pulp: Unbleached—liner and toweling; bleached—waxing, carbonizing, toweling, and dissolving.

"There is presently no neutral sulfite semichemical pulp on the market," the speaker continued. "All of the pulp produced is used in an integrated operation. Some manufacturers are known to be interested in making market pulp. Some doubt exists about the ease of repulping semichemical pulp, but there is evidence also to the contrary." There probably will be no large quantity of semichemical market pulp for several years, he concluded.

Western sulfite, sulfate

Dr. Bialkowski of Weyerhaeuser reviewed recent developments in the operations of his firm in sulfite and sulfate pulping on the West Coast.

The speaker voiced confidence over the future growth and improvement of pulping processes in the West and Northwest. Modern forest management in the area has resulted in sustained yield and hence good supply of the sulfite and sulfate species, including Douglas fir.

The history of Weyerhaeuser's pulping operations covers the past 10 to 15 years, Dr. Bialkowski declared. "The first pulping unit went into operation in 1931 at Longview, Wash., making a high-grade bleached sulfite pulp from western hemlock," he said. "This plant received its raw material from the Mt. St. Helena tree farm, which supplied Douglas fir and cedar logs to the firm's three Longview sawmills. In 1936, the Everett sulfite mill was built to use hemlock logs. . . . This was the initial step in the utilization of all species from the forest land. The term 'all species' does not mean that all trees or all parts of

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the trees were brought in from the forest. Complete utilization . . . was then impractical because of uneconomical production and market conditions.

"... Probably one of the most significant and far-reaching factors affecting the supply of raw material for the West Coast pulp industry was the development of a successful hydraulic whole log barker by Weyerhaeuser in 1942. The installation was made at the Everett sulfite mill in conjunction with a whole log chipper and resulted in savings of approximately 20 per cent. . . . The hydraulic barker was also the key to the recovery of sound clean wood from the sawmills."

Certain advantages

"There have not been too many changes in sulfite pulping in recent years, except for the modifications of bases," the speaker continued. "There is no doubt that the more soluble bases have certain advantages over calcium in the older cold and low-acid strength systems. However, the advantages are sharply narrowed down when compared with hot acid and high-acid strength installations. The use of these bases is justified when associated with complete heat and chemical recovery. At Longview we have installed the magnesia base system for complete chemical and heat recovery, and the equipment and operation are quite similar to modern kraft operations."

Dr. Bialkowski concluded his address with brief reference to bleached Douglas fir kraft, which Weyerhaeuser introduced as a market pulp in 1948. Douglas fir pulp, he said, "refines more easily than krafts from other species, and it also 'forms up' remarkably well for a long fiber. Fir pulp has about the highest tear of all conifers.

"... Our pulping units are typical of present-day design—vertical stationary digester with indirect heating and forced circulation, four-stage washers, multiple effect evaporators, direct contact evaporators, and Babcock & Wilcox or Combustion Engineering recovery furnaces. On recent installations we are using high-density storage and Lindblatt screens ahead of the bleach plant and ahead of the drying machines.

Bleaching sequences

"Our bleaching sequences are as follows: direct chlorination, caustic neutralization or extraction, alkaline hypochlorite, caustic extraction, and one or two final hypochlorite stages with a final acid wash. Our first unit was an all-batch operation, the second was all continuous, and the most recent unit is a combination continuous and batch.

"We are currently marketing two grades of kraft pulp," he concluded, "one a regular paper grade kraft for general utility purposes and the other

a soft kraft for sanitary purposes and special paper requirements. Both are bleached to a brightness of 86 G.E."

Dr. Arnold made the following observations based on his European tour: (1) The paper industry in Europe is suffering from a temporary recession—with the possible exception of Belgium; (2) price of creped kraft is generally 15 per cent higher than flat kraft; (3) increased competition is producing a marked trend of general interest toward kraft specialty papers, and (4) there is considerable basic research in all phases of the pulp and paper industry.

Values of Wet-Strength Papers Outlined at Chicago Tappi

The need for a greater appreciation of wet-strength papers was stressed at the September 21 meeting of the Chicago Section of Tappi. Speakers at group's first meeting of the 1953-54 season were representatives of American Cyanamid Co.

Appearing on the program were G. E. Fromm, American Cyanamid's western regional manager for the Paper Chemicals Department; A. Asherman of the firm's advertising department, and Phillip Barber of Barber & Baar Associates Inc., New York, N.Y., public relations consultants. Presiding at the meeting was the section's chairman, E. C. Berg of Ace Carton Corp. Charles Krebs of Atlas-Boxmakers Inc., program chairman, introduced the speakers.

AMONG THE SPEAKERS at Chicago Tappi's September meeting were A. Asherman (l) and G. E. Fromm, both of American Cyanamid

Participants in the discussion stressed the fact that, while the industry has been using resins to impart wet-strength to paper and paperboard for a number of years, the consumers as well as the distributors of these products have not been fully aware of the "plus values" they receive. American Cyanamid, pioneer in the development of wet-strength papers through the application of its Melostrength resins, has undertaken an educational program to bring about a greater appreciation of wet-strength products.

WIDEST
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THE CONTINENTAL
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Moving forward as Industry moves, Continental's newest and largest paper machine goes into operation at Hopewell, Va. Lindsay was entrusted with building, for this purpose, a Fourdrinier wire 272" wide, the widest now in use in the United States.
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Coming Events

TAPPI meetings

Nov. 18-20—Seventh Alkaline Pulping Conference, Rice Hotel, Houston, Texas.

Dec. 4—Delaware Valley Section, Engineers' Club, Philadelphia.

Jan. 19—Pacific Section, West Linn, Ore.

Jan. 22—Southeastern Section, Hotel Dempsey, Macon, Ga.

Jan. 28—Delaware Valley Section, Engineers' Club, Philadelphia.

Feb. 15-18—39th Annual Meeting, Commodore Hotel, New York, N.Y.

American Pulp & Paper Mill Superintendents Association meetings

Dec. 4-5—Pacific Coast Division, New Washington Hotel, Seattle.

Jan. 26—Miami Valley Division, American Legion Hall, Middletown, Ohio.

Feb. 25—Miami Valley Division, American Legion Hall, Middletown, Ohio.

Other meetings

Dec. 6-8—Chemical Specialties Manufacturers Association, 40th annual meeting, Mayflower Hotel, Washington, D.C.

Dec. 13-16—American Institute of Chemical Engineers, annual meeting, Hotel Jefferson, St. Louis.

Jan. 27-29—CPPA Technical Section, annual meeting, Sheraton - Mount Royal Hotel, Montreal.

I've seen them make board without a press . . . never without felts!

During the shortage in war times, when production was more important than costs, some mills ran the sheets direct from the wet end of the machines to the drier rolls without passing through a single press. The excess water had to be cooked out—and cooking is costly.

In these highly competitive times any mill would go broke if its machines were not equipped with felts capable of removing most of the water through the open spaces between threads. The more water squeezed out by the press the less heat required to complete the drying. And, the larger the open spaces in the felt, the more water will be removed.

But unless the open spaces are well protected by the nap of the felt too many fibers will go through with the water. This explains why so many mill superintendents insist on having Hamilton Felts—to remove more water quicker and to filter out any fibers that may be captured in the long, thick nap.

From the 300 different styles of Hamilton Felts you will find one that will do your work better, faster and at lower cost.

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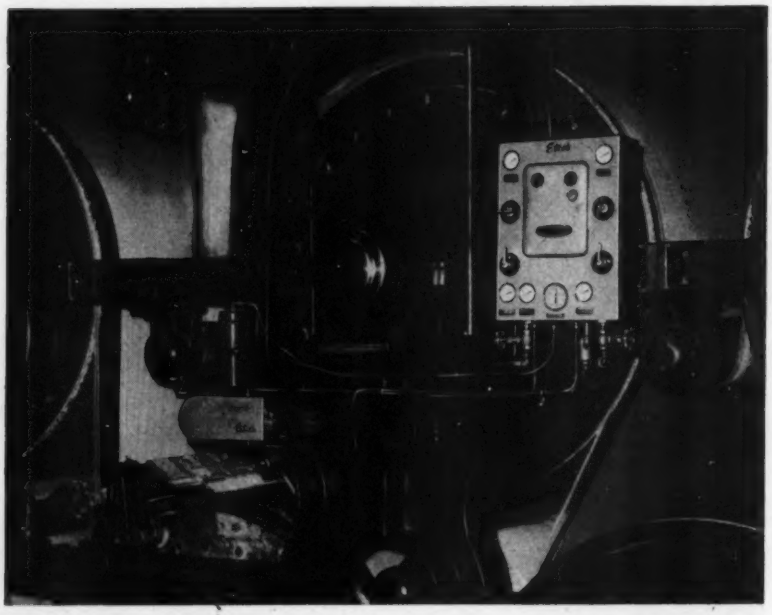

No hydraulic piston!

No chains, pulleys or weights!

Regulation of steam flow is instantaneous.

All gauges and controls are grouped at control panel.

Less fluctuation in steam flow to dryers.

Handles combination machines

Under actual operation in a 24-hour test, on a 33-lb. 24x36 500-basis sheet, the new Stickle control held moisture content within 3/10 of 1%.

A recording device may be included in the system to provide a permanent record of drying pressure, moisture variation and any interruption of the sheet in passing over the dryers.

The new Stickle Automatic Tension and Pressure Trol is a simple, compact and versatile system for faster and easier moisture control of any type of paper or paper board, regardless of machine speed.

The control automatically provides instantaneous regulation of steam flow to the dryers—without cycling or surging.

All gauges and controls are grouped at the control panel for more convenient reading and adjustments. There is no hydraulically operated piston, no mechanical linkage, no chains, pulleys or weights.

Both tension and pressure phases of the new control may be operated together, or independently. Use of the pressure control alone provides accurate regulation of steam in the dryers when paper is off the machine . . . permits control of combination machines when crepe and light tissues make use of tension roll impractical.

Every Stickle installation is guaranteed to obtain predetermined results. Write, wire or telephone today for full details.

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The Paper Industry Names in the News

Petry Named Assistant Woodlands Manager at Nepco

ROBERT A. PETRY has been appointed assistant manager of woodlands operations for Nekoosa-Edwards Paper Co., Port Edwards, Wis.

A graduate forester of the University of California, Mr. Petry was employed for about nine months by Wood County (Wis.) as a surveyor of forest lands before joining the Nepco woodlands department in 1940.

Following his discharge from military service in 1946, he rejoined Nepco as woods superintendent of the firm's Canadian operations. In April of 1948 he returned to the home office, where he has been in charge of land acquisition, while assisting in pulpwood purchases.

Robert Petry

Harry Deyo

Nepco Official Retires

HARRY DEYO, controller and assistant treasurer of Nekoosa-Edwards Paper Co. of Port Edwards, Wis., has retired due to ill health. He is a 35-year veteran in the paper industry.

Joining the paper mill staff in 1918, Mr. Deyo rose through the laboratories and every phase of office administration. He worked in Nepco's laboratory, finishing and shipping department, and time office before transferring to the accounting department. Specializing in costs and accounting, he was elected assistant secretary in 1934 and assistant treasurer in 1943. Mr. Deyo has been particularly active in the development of improved cost accounting methods and served for two years as a director of the northern Wisconsin chapter of the National Association of Cost Accountants.

National Folding Box Elects W. C. Palmer President

At a meeting of the board of directors of National Folding Box Co. Inc. of New Haven, Conn., *F. S. SYMINGTON* was elected chairman of the board, while *W. C. PALMER* was chosen president. *WALTON D. LYNCH* resigned as chairman of the board but will continue as a director.

Five new directors were also elected to the board. In addition to Mr. Symington, Mr. Palmer and Mr. Lynch, they are *C. P. JEPPESEN, F. E. ENDRISS, J. R. KENNEDY, H. T. BROWN, A. G. FREAS, A. F. MAXWELL,* and *E. A. SCHRADER.*

National's current officers include: Mr. Symington, chairman; Mr. Palmer, president; Mr. Kennedy, chairman of the executive committee; Mr. Jeppesen, vice president in charge of production; *E. BURTON WALL,* vice president in charge of sales; *JAMES G. LaGRUA,* vice president; *D. W. MABEE,* vice president; *ROBERT A. WALLACE,* secretary; Mr. Endriss, treasurer and assistant secretary; *W. R. COMPTON,* comptroller, and *JAMES McINTYRE,* assistant treasurer.

(Announcement was recently made of the purchase of a majority of National's capital stock by Federal Paper Board Co. Inc. of Bogota, N.J.)

Elias Named Superintendent at Bergstrom Paper

Foster P. Doane Jr., production manager of Bergstrom Paper Co., Neenah, Wis., has announced the appointment of *RICHARD M. ELIAS* as mill superintendent to fill the post left vacant by the recent death of Thomas W. Seidel. Mr. Elias, formerly assistant superintendent, is a graduate of Lawrence College and did graduate work at the Institute of Paper Chemistry. He has been associated with the firm since 1949.

Luke a Westvaco Vice President

The board of directors of West Virginia Pulp & Paper Co. has elected *DAVID L. LUKE III* a vice president of the firm. The action was taken at a board meeting September 17.

Since February 1952 Mr. Luke has been responsible for coordinating company research activities with planning, while carrying out broad financial studies and acting as liaison with subsidiary organizations.

A graduate of Yale University, Mr. Luke was associated with Arthur Anderson & Co. of New York, N.Y., and with American Research & Development Corp. of Boston before joining the staff of Westvaco. He is a director of Snyder Chemical Corp. of Bethel, Conn., and Brunswick Enterprises Inc. of New York.

CHARLES GRONDONA, vice president of Hudson Pulp & Paper Corp., has announced his resignation. His most recent assignment has been supervising the design and construction of the American-Israeli Paper Mill in conjunction with Merritt-Chapman, Scott Corp.

Chas. Grondona

R. E. Stearns

Stearns Appointed by United Board & Carton

RAYMOND E. STEARNS, formerly executive vice president of Empire Box Corp., has been named assistant general manager of United Board & Carton Corp. He will have his headquarters in New York, N.Y.

Mr. Stearns will supervise the purchasing, traffic, personnel, carton manufacturing, paperboard manufacturing and financial departments of the company. He reports directly to William S. Stuhr, president and general manager.

A native of Ohio, Mr. Stearns started his career with Container Corp. of America in Philadelphia, becoming general superintendent of that plant. Following his association with Container Corp., he joined United as superintendent of mills and later was named vice president in charge of production. He joined Empire's staff several years ago.

Four paper mill executives were among seven Wisconsin industrialists honored for "outstanding service to the timber industry" during the eighth annual Lake States Logging Congress held in Rhinelander, Wis., September 17. Those cited include: *STANTON W. MEAD,* president of Consolidated Water Power & Paper Co.; *FOLKE*

BECKER, president of Rhinelander Paper Co.; *D. C. EVEREST*, chairman of the board of Marathon Corp., and *JOHN D. MYLREA*, treasurer of Mosinee Paper Mills Co.

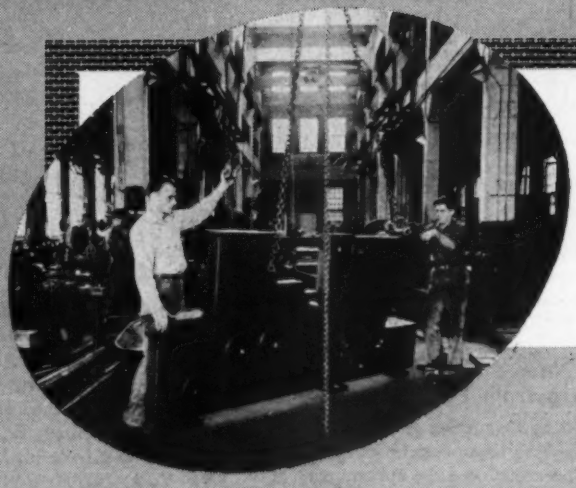
MALCOLM HIGGINS, a former staff member of Marathon Corp.'s personnel division, has been named executive secretary of the Governor's Fair Employment Practices Commission for the state of Kansas.

LAURENCE F. WHITTEMORE, chairman of the board and executive officer of the Brown Co., Berlin, N.H., has been elected a director of the Chamber of Commerce of the United States. He represents the organization's first election district.

ERNST MAHLER, chairman of the board of International Cellucotton Products Co. of Neenah, Wis., and formerly executive vice president of Kimberly-Clark Corp., has been reelected a member of the board of Russell-Miller Milling Co. of Minneapolis.

CHARLES ALLEN of Detroit Sulphite Pulp & Paper Co. has been elected chairman of the Michigan Forest Industries, advisory group to American Forest Products Industries Inc.

"From ingot to fourdrinier wire"



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Our machine shop doesn't make hairsprings or bridge beams, but our maintenance and construction operations demand equal versatility from our men and machines. Hub of an integrated operation such as ours, its skilled personnel are ready to machine a part to a fraction of a thousandth of an inch, on a tiny instrument part or a huge loom frame.

Because our plant is *completely integrated*, every wire we ship has undergone thorough and continual analysis, control and testing from the raw metals to your finished fourdrinier wire ready for quality paper production.

We are proud to say they are *truly ours* — "from ingot to fourdrinier wire."

EASTWOOD-NEALLEY CORPORATION
Belleville, N. J.

The Great Lakes Paper Co. Ltd. has announced the appointment of *C. J. WARWICK FOX* as vice president and general manager at Fort William, Ont. Mr. Fox resigned his seat in the Quebec legislature to accept the post. W. Earle Rowe, president of the firm, will remain in the Toronto office.

FRANCIS J. SULLIVAN, formerly with Ottawa River Paper Co. at Toledo, Ohio, has been appointed a special sales representative for the container division of Robert Gair Co. Inc.

F. J. Sullivan

R. H. Cubberley

R. H. CUBBERLEY has been appointed director of research for all divisions of the Flintkote Co. He will be located at the research laboratory in Whippanny, N. J.

JAMES A. GANNETT, who retired in July as registrar at the University of Maine, Orono, has been named resident secretary of the U. of M.'s Pulp and Paper Foundation. The announcement was made by J. L. Ober, vice president of Scott Paper Co. and president of the foundation.

NORMAN B. WHITTIER, formerly associated with the pulp and paper industry in New England, has been appointed budget director of Hammermill Paper Co., Erie, Pa.

KENT LARICK, formerly with the Maxwell Paper Co. Division of Howard Paper Mills Inc., has been made mill manager of the Miamisburg Box Board Division of Interstate Folding Box Co., Miamisburg, Ohio.

Container Corp. of America has announced the following appointments at three of the firm's corrugated shipping container plants: *NEVEN R. RAUCH*, general manager, Boston; *WILLIAM B. GROFF*, general manager, Cleveland, and *MARVIN L. SHELTON*, general manager, Fort Worth. At the same time, *EVERETT G. TEMPLE, MARSHALL P. FOX*, and *JEAN R. NEIL* were named general managers of the folding carton plants at these locations.

R. M. FOWLER of Montreal, president of the Canadian Pulp & Paper As-

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sociation and of the Newsprint Association of Canada, has been elected chairman of the executive committee of the Canadian Chamber of Commerce.

STANLEY L. OBERG has been made general manager of Container Corp. of America's container plant at Rock Island, Ill. He has been a member of the organization since 1937 and has served as sales manager at Rock Island since 1950.

ROGER R. BAY, 21-year-old graduate of the School of Forestry at the University of Idaho, has received the Minnesota & Ontario Paper Co. Forestry Research Project Award. Established in 1946, the graduate fellowship provides for concentrated studies on forestry problems meriting special attention. This year's fellowship will be used to continue the previously initiated study of reproduction in cutover areas of the spruce-fir-hardwood type on state and private lands in northern Minnesota.

JAMES TALBOYS has been appointed manager of the Jersey City, N.J., plant of Gaylord Container Corp. A graduate of Marquette University, he has been with the firm seven years.

VERN MUELENBELT has been named electrical engineer for Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis. A graduate of Rose Polytechnic Institute, for the past three years he has been employed by General Electric Co. in work related to the paper industry.

G. H. McVEAN, manager of sales for American Can Co.'s Canadian Division, has been elected to the newly created position of vice president in charge of operations in Canada. He succeeds *GORDON MANN*, who retired as general manager of the Canadian Division after 34 years' service. Mr. McVean was at one time manager of the Montreal plant, later becoming manager of Vancouver operations.

JAMES D. WILSON has been elected assistant treasurer of the Brown Co. and the Brown Corp.

JOHN G. ROBINSON has been elected chairman of the board of California Container Corp., a wholly owned subsidiary of Container Corp. of America. At the same time, *THOMAS F. CASS JR.* and *ROY E. FEFLEY* were named vice presidents.

LOGAN W. MATHER has been promoted to the position of chemist in the technical department of Gardner Board & Carton Co., Middletown, Ohio. He joined the firm in 1927 as a laborer in the Lockland Division.

JOSEPH A. QUINLAN, vice president and a director of St. Regis Paper Co., has been named a director of the Rutland Railway.

SIDNEY L. SCHWARTZ, chemical engineer at the U.S. Forest Products Laboratory in Madison, Wis., is in Israel helping to put a new wallboard plant into operation. The development of the plant was an outgrowth of research conducted at the laboratory for the past two years. The lab cooperated with an Israeli agency to find a use for scrap from a mill making veneer and plywood from okume, an African wood.

WILLIAM H. BRICKNER has been appointed to the position of industrial engineer at the Gardner Board & Carton Co. of Middletown, Ohio. He was formerly a liaison engineer with the U. S. Atomic Energy Commission in Albuquerque, N.M.

FRANK A. BIEDERMAN, advertising and promotion manager for Kimberly-Clark Corp.'s Kimsul and creped wadding products, has retired after 28 years' association with the firm. Mr. Biederman worked for the company in its Chicago office from 1925 to 1945, at which time he was transferred to K-C's headquarters. He was given charge of establishing national markets for the firm's packaging material.

a size for every mill

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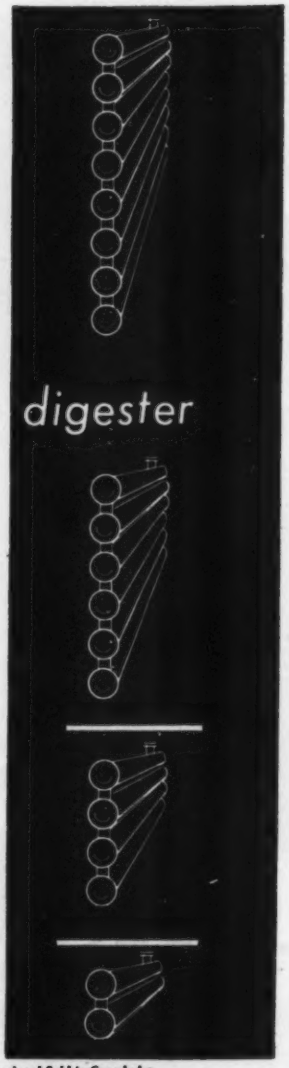
continuous digester



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STAINLESS STEEL ROLLS OUTLAST ALL OTHERS

The reliability and long life of Midvale stainless steel rolls has been proved again in a large Eastern mill. On the same installation where regular rolls in the water box positions pitted and corroded badly . . . Midvale stainless steel rolls are still going strong.

Skill and experience of Midvale craftsmen assure rolls built to your most exacting specifications of hardness and finish. Modern equipment and quality control—from furnace to finished roll—produce rolls unsurpassed in performance . . . production-proved in America's leading mills.

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The Paper Industry Necrology

Claude P. Elston

Claude P. (Jack) Elston, 66, who was advertising manager for West Virginia Pulp & Paper Co. prior to his retirement in 1952, died October 18 in a Greenwich, Conn., hospital.

Mr. Elston joined the Westvaco staff in 1904 as a clerk in the sales department. He is probably best known for his efforts in connection with *Westvaco Inspirations for Printers,* a publication that has won wide recognition in graphic arts circles.

William Rounds

William Rounds, one-time treasurer and vice president of Combined Locks Paper Co., Combined Locks, Wis., died in Chicago October 12. His home was in Momence, Ill.

Born in England, Mr. Rounds was associated with Combined Locks from 1922 until 1938. He served as treasurer of the firm from 1925 to 1931, at which time he was elected vice president, serving in both capacities until his resignation in 1938.

Paul C. Wesco

Paul C. Wesco, vice president in charge of sales and a director of Fox River Paper Corp., Appleton, Wis., died October 9. He had been in ill health for a year.

Born in Hamilton, Ohio, in 1898, Mr. Wesco moved to Appleton in 1921 as an assistant sales manager for Tuttle Press Co. In 1925 he became general sales manager for Tuttle and in 1933 joined the staff of Fox River Paper. Mr. Wesco was appointed sales manager for Fox River in 1940 and assumed the vice presidency in 1945.

Carl Raddant

Carl Raddant, 55, paper mill executive at Shawano, Wis., died unexpectedly September 27. He had been associated with Shawano Paper Mills since 1921. He started his career as an accountant and later became production and traffic manager. For the past 10 years, Mr. Raddant was also in charge of the sales department.

Luther F. Winchell

Luther Francis Winchell, president and general manager of Hinde & Dauch Paper Co. of Canada Ltd., died October 3 in Toronto. He joined the firm in 1931 as vice president and general manager and was appointed president only last year.

In 1932 Mr. Winchell represented the Canadian pulp and paper industry at the Empire Conference. Born in the United States, he became a naturalized Canadian in 1936. He was a past president of the Toronto Board of Trade.

Robert H. Smith

Robert H. Smith, retired paper mill superintendent, died recently at Kalamazoo.

A member of the Superintendents Association since 1933, Mr. Smith started his papermaking career as a fourth hand at Kalamazoo Paper Co. when he was 15. He was associated with King Paper Co. between 1905 and 1916, at which time he joined the staff of Bryant Paper Co. He became superintendent of the Milham Division and remained with the firm until 1945. His more recent experience has been with mills in Reading, Pa.; Otter River, Mass., and finally with St. Regis Paper Co., from which firm he retired.

Richard C. Floyd

Richard C. Floyd, 66, former vice president and general sales manager of Bird & Son inc., died September 15 at Boston's Peter Bent Brigham Hospital.

A 1911 graduate of Harvard University, Mr. Floyd became associated with Bird & Son shortly thereafter, remaining with the firm until his retirement in 1946. He had been a director of the Harvard Alumni Association; a member of the board of governors of the Harvard Club of Boston; trustee of the Dexter School and the Park School, and a director of the Intercollegiate Athletic Association.

Michael J. Power

Michael J. Power, 81, who was responsible for the development of several machines and appliances used in the pulp and paper industry, died at his home in Nekoosa, Wis., September 24. He was founder and past president of Nekoosa Foundry & Machine Works Inc.

A native of Brampton, Ont., Mr. Power came to the United States in

1893 and to Nekoosa in 1903. He was employed by Nekoosa-Edwards Paper Co. until 1918, at which time he established the foundry and machine works.

Ivan E. Garver

Ivan E. Garver, 65, former president and chairman of the board of D. M. Bare Paper Co. at Roaring Spring, Pa., died September 23. His grandfather, the late D. M. Bare, founded the company. Mr. Garver also held posts as president of Roaring Spring Blank Book Co. and of the Roaring Spring Bank.

Francis J. Spiess

Francis J. Spiess, paper machinery designer and assistant general superintendent of Eddy Paper Corp.'s plants throughout the country, died September 15 in Rochester, N.Y. He was 59.

Mr. Spiess became president of Rochester Folding Box Corp. in 1920. He designed and developed the quad machine, which folds cardboard into boxes, and finishing machines for corrugated paper boxes. When Eddy took over the Rochester box firm, Mr. Spiess was retained as manager of the local plant.

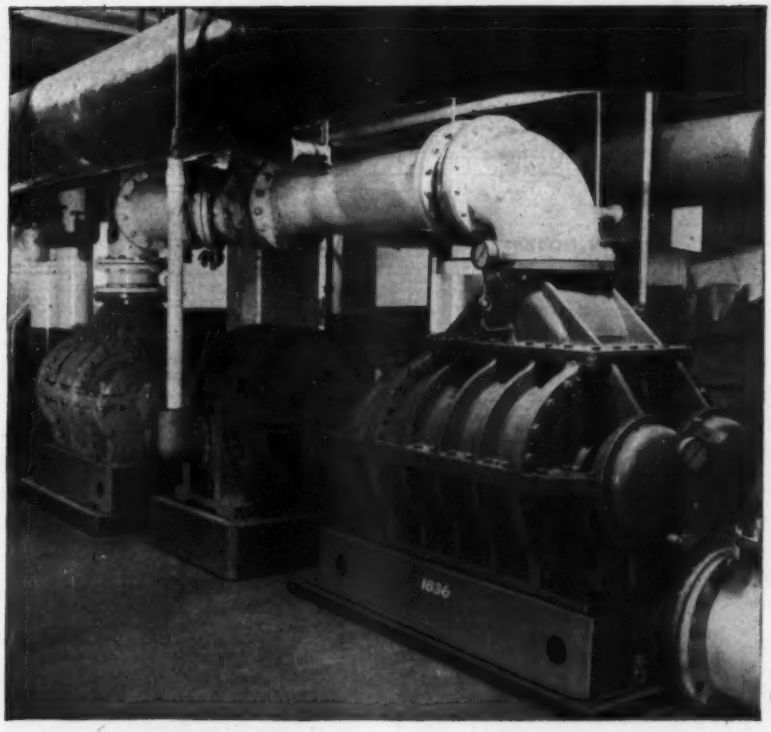
Charles E. Riedhauser, 33, of Neenah, Wis., died recently of injuries received in an automobile accident at Delaware, Ohio, September 20. Mr. Riedhauser was Midwestern sales representative for H. Waterbury & Sons Co. of Oriskany, N.Y. Formerly with Morey Paper Mill Supply Co., he had joined the felt manufacturing firm in January, 1953. Mr. Riedhauser covered the states of Wisconsin, Minnesota, Illinois, Michigan, Indiana and Ohio.

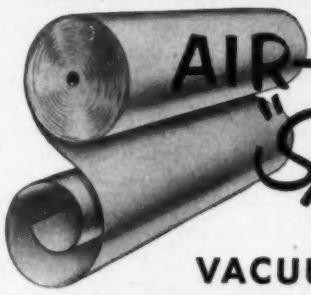
C. E. Riedhauser

Roy Bensing

Roy Bensing, 56, one of the founders and owners of Bensing Bros. & Deeney, manufacturers of BBD printing inks, died September 27 after a brief illness. He was a resident of Haddonfield, N.J.

Ludwig T. Straus, 72, a native of Germany and brother of the late Harry H. Straus, who founded Ecusta Paper Corp., died August 31 at Mount Kisco, N.Y. He had been associated with Ecusta from 1939 until his 1951 retirement.





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The Paper Industry Patent Reviews

MELVIN NORD*

Valve Bag

U.S. 2,651,451, issued Sept. 8, 1953, to Richard F. Bennett and assigned to Universal Paper Bag Co., relates to multi-ply valve bags, such as are commonly used for packaging materials like cement or grain. In valve bags, one of the upper corners is provided with a folded construction which forms an open passageway through which a filling tube may be inserted to fill the bags. After the bag is filled, the tube is withdrawn, and the wall of the passageway is pressed against the bag wall by the contents of the bag to form a "more or less" effective seal.

As shown in Fig. 1, the bag consists of several plies, 1, 2, 3, and 4. The bag is formed with a gusset 5, and the valve 6 is formed in the usual manner by folding the top corner material inwardly at the gusset. The top of the bag is closed by a binding strip 7 secured by stitching 8.

The valve is provided with a series of parallel slits 9, spaced ¼ to ½ in. apart, so that the inner edge of the valve is in the

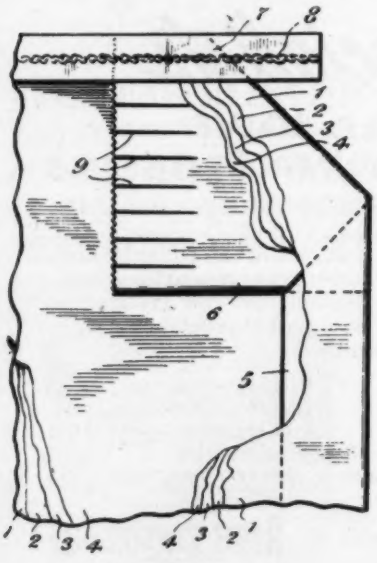


Fig. 1

form of a series of superimposed fringe elements, all of which are free to adjust themselves in any direction depending on the forces to which they are subjected. They can move laterally to interleave themselves, or they can move vertically to fill or close crevices through which leakage might otherwise occur. As a result, a very effective seal is provided at a cost of only negligibly greater than that of an ordinary valve.

*Patent attorney, 664 Putnam, Detroit, Mich.

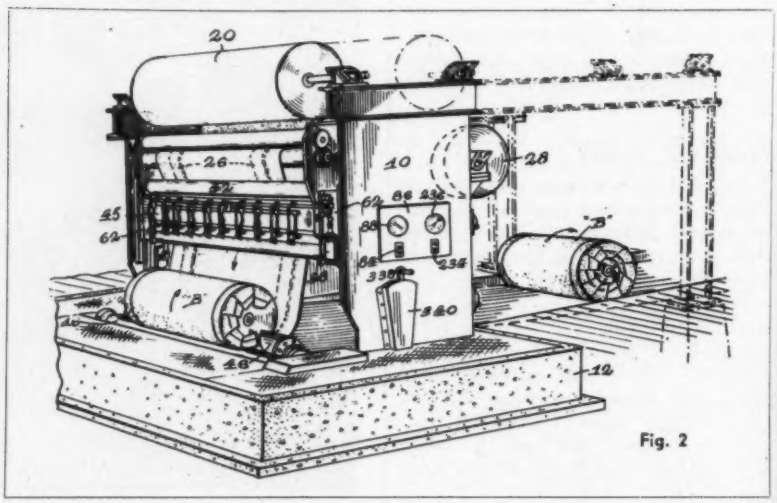


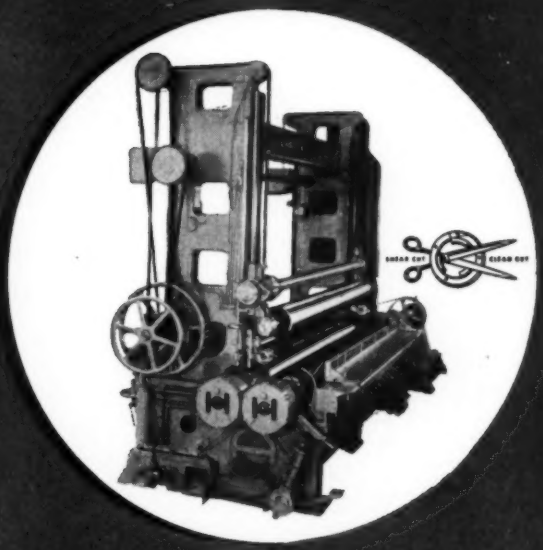
Fig. 2

Paper Roll Wrapping Machine

U.S. 2,638,725. by Alfred T. Hurter and Andre C. Attendu, issued May 19, 1953, and assigned to Stadler, Hurter & Co., describes an automatic paper roll wrapping machine designed to reduce manual handling of the rolls to a minimum. The apparatus is shown in Fig. 2. It combines in a single machine and at a single station means for applying simultaneously both a body wrapper and edge bands and for simultaneously turning in the edges of the body wrapper and edge bands. The machine is capable of wrapping paper rolls from 24 to 44 in. in diameter and from 18 to 84 in. in length.

Other Patents of Interest to The Paper Industry

Subject	*Inventor or Assignee*	*Patent No.*	*Date*
Antideflection paper machine roll	Beloit Iron Works	2,648,122	8/11/53
Fiber disintegrator	Chaplin Corp.	2,648,261	8/11/53
Fibrous material extrusion apparatus for the manufacture of fiberboard	American Manufacturing Co., Inc.	2,648,262	8/11/53
Method and machine for producing a cellular structure from a web of paper	George I. Goodwin	2,648,371	8/11/53
Display carton	Waldorf Paper Products Co.	2,648,427	8/11/53
Dispensing container	Chicago Carton Co.	2,648,429	8/11/53
Easy packing deep container	Belsinger, Inc.	2,648,480	8/11/53
Heavy duty fiber container	Belsinger, Inc.	2,648,481-4	8/11/53
Cardboard box	Douglas Young, Inc.	2,648,485-6	8/11/53
Bag for packaging tacky polymeric materials such as butyl rubber	St. Regis Paper Co.	2,648,487	8/11/53.
Method of flameproofing wallboard	Harold C. O'Brien	2,648,615	8/11/53
Rotary steam drier	Fanny M. Engstrom	2,648,914	8/18/53
Pulpwood product	Clarence U. Gramelspacher	2,649,034	8/18/53
Apparatus for making stiffened wrappers	William S. Cloud	2,649,035	8/18/53
Machine and method for producing continuous honeycomb structures in paper	John D. Lincoln	2,649,131	8/18/53
Apparatus for deinking and defibering wastepaper	Charles S. Reid	2,649,371	8/18/53
Manufacture of coated paper	North American Paper Process Co.	2,649,386	8/18/53
Air-laying fiber felts	Wood Conversion Co.	2,649,394	8/18/53
Carton	William P. Frankenstein	2,650,015	8/25/53
Parcel bag	Coboes Envelope Co., Inc.	2,650,016	8/25/53
Blank feeding mechanism	S & S Corrugated Paper Machinery Co., Inc.	2,650,093	8/25/53
Apparatus for handling paper in sheet form	The Champion Paper & Fibre Co.	2,650,705	9/ 1/53
Folding carton	Marathon Corp.	2,650,751	9/ 1/53
Drier drum for a paper machine	Beloit Iron Works	2,651,114	9/ 8/53
Calender roll guide and feed mechanism	Walter W. Neely and Herbert W. McAfoos	2,651,242	9/ 8/53
Method and apparatus for cutting paper webs	Colodense Ltd.	2,651,364	9/ 8/53
Container construction	Gerber Products Co.	2,651,449	9/ 8/53
Sealed container	The Ohio Boxboard Co.	2,651,450	9/ 8/53
Mineral coated paper	S. D. Warren Co.	2,651,580	9/ 8/53



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Dissolving sodium sulfide from green ash

A strong solution of sodium sulfide, containing only a small amount of sodium carbonate, can be produced from the green ash obtained from the black liquor of the sulfate process or the sulfite process. The method is described by Robert S. Aries and Arthur Pollak in U.S. 2,642,399, issued June 16, 1953.

The essential feature of the process is based on the fact that a strong solution of sodium sulfide has a limited solubility of sodium carbonate. Accordingly, the molten green ash is charged continuously to a large body of hot concentrated sodium sulfide solution, along with additional water. Most of the sodium carbonate remains undissolved while the sodium sulfide dissolves. The sodium carbonate is withdrawn as a suspension, along with some concentrated sodium sulfide solution. After settling and filtering, the sodium sulfide solution is recycled in amount sufficient to maintain the desired sodium sulfide concentration in the dissolving tank, the rest being taken off as product.

Antideflection Roll Assembly

U.S. 2,651,103 and 2,651,241, issued Sept. 8, 1953, to Lloyd Hornbostel and assigned to Beloit Iron Works, relate to improvements in rolls used in papermaking which are subject to enough pressure to cause sufficient deflection to make crowning of such rolls advisable.

In a stack of calender rolls, for example, the bottom roll is subjected to a large amount of pressure and, having no roll under it, has a tendency to deflect. It is customary to offset this by grinding the bottom calender roll to provide a small amount of crown, so that when the deflection does occur, it will be offset by the crowning. However, such a crown is effective only for the single calculated pressure for which it was designed.

Fig. 3

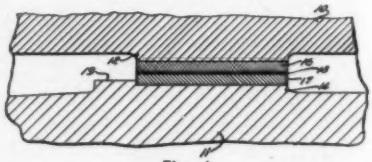

Fig. 4

As a general rule, bottom calender rolls are supported on journals which are part of the rolls and supported on bearings outside the face of the rolls. The present invention provides a roll and axle assembly in which a through axle is provided with annular bearing surfaces or pads well inside the roll, while corresponding bearing surfaces or pads on the inner surface of the roll cooperate with these axle bearing surfaces. Thus, the roll is supported not at its ends but at intermediate positions. It has been found that this eliminates the need for crowning. This type of support results in some relative movement between the pads of the roll and axle, which can be corrected by interposing a rubber element between the pads.

In Fig. 3, a roll 10 is shown mounted on an axle 11. Annular pads 14 and 15 are supplied for supports. A sleeve 16 and collar 17, with a thin layer of rubber in between, are shown in Fig. 4. Preferably, the rubber is bonded to both the sleeve and the collar. The sleeve 16 should have a very tight press fit within the roll shoulder 12, while the collar 17 should have a tight press fit on the enlarged portion 14 of the axle. A 1/16-in. thickness of rubber is generally sufficient.

A guide shoulder 19, as shown in Fig. 3, would also be added next to the pad 15 after assembly of the roll and axle.

Butadiene-Styrene Sized Paper

In U.S. 2,650,163, issued Aug. 25, 1953, to Eleanor F. Horsey and William D. Thompson, and assigned to Hercules Powder Co., a butadiene-styrene copolymer (25% butadiene to 75% styrene) is added to paper pulp with a rosin size. The paper prepared therefrom shows improved sizing and wet strength characteristics, such as greatly increased wet strength and greatly increased resistance to the penetration of water-base inks. It is claimed that the sized papers prepared therefrom are highly superior to similar papers containing other sizing agents.

Several detailed examples are given in the patent specification.

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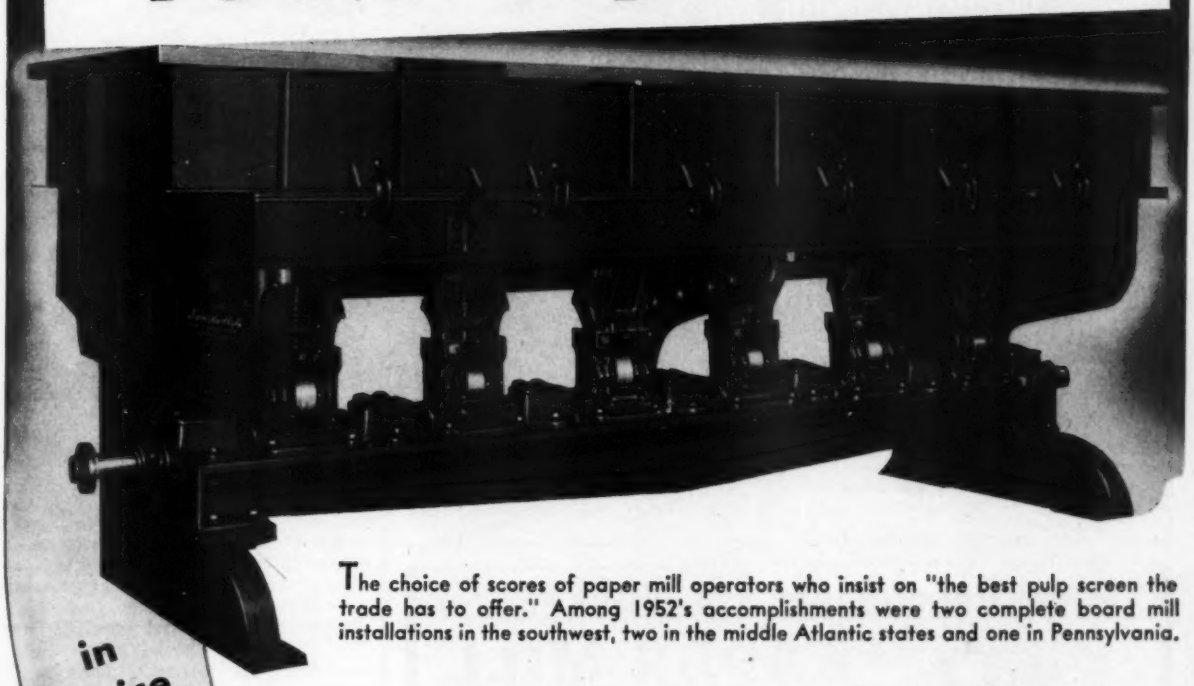

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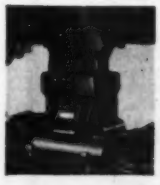

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The Paper Industry Foreign Abstracts

Fiber structure and pulp properties

From a 12-year-old pine (*Pinus radiata*), by taking successive growth rings, wood samples with different fiber characteristics are obtained. This provides material of increasing fiber length (I) and decreasing micellar spiral angle (II). Chips are made separately from each annual growth ring, and these chips are cooked separately to a given permanganate number, by the kraft process. All the cooking conditions are kept constant excepting time, thus yielding pulps with very similar chemical characteristics but with different fiber properties.

As I and II show progressive changes from bark to pith, they can be related only to those sheet properties which show steady trends. At the higher breaking lengths, tensile strength appears to be related to fiber length, and although no correlation is established, the burst and folding endurance show similar trends. At the seventh growth ring, tear and bulk reach their highest values and cannot be greatly influenced by either I or II. Good correlations are established between basic density of the wood and most of the properties of the test sheets made from unbeaten pulps. Tear and bulk show a positive relationship, whereas burst, folding endurance, and air resistance show negative relationships. Thus, the factors that are responsible for differences in basic density have a greater influence on most paper properties than have either I or II. A. J. Watson, A. B. Wardrop, R. E. Dadswell, and W. E. Cohen. *Australian Pulp and Paper Tech. Assoc. Proceedings*, 1952, 243-266; discussion, pp. 266-69.

Poplars in the Italian paper industry

The author discusses the growing importance of poplar wood in the Italian pulp and paper industry. He also discusses improved forest practice, the species grown and their biological and physical properties. The suitability of poplar pulp used alone or in admixture with other furnishes, the strength properties of papers made from poplar pulps, fiber dimensions, the production of chemical and groundwood pulps, and pulp yields are reported. The effects of using seasoned and green wood are also alluded to. Vinzeno Pessolano. *Industria carta* (Milan), 7, No. 1, 2-7 (1953), through *Bull. Inst. Paper Chem.*, 24, 45 (1953). (Original in Italian.)

Basis weight determinations by the beta-comparator LKB 3265

Previous reports by Cohn (*Svensk Papperstidn.*, 55, 327) and by Westermark (*Ibid.*, p. 278) describe the continuous recording of basis weight of paper by means of the Swedish "Betakomparator LKB 3265." A schematic sketch is shown in Fig. 1. The instrument is now studied with reference to its ease of operation and accuracy; and, as the result of preliminary trials, the original apparatus is modified so as to avoid deposition of fibers on the windows of the

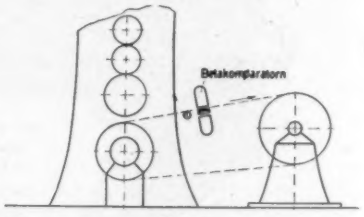


Fig. 1

source of radiation and of the ionization chambers. This could be prevented by introducing a jet of air, which also eliminates condensation on the windows and serves to control and equalize temperatures in the gaps.

Evidently, the velocity of the running paper web affects the measurement of its basis weight. For example, at a basis weight of 55 gm. per sq. m., an apparent increase of 3 per cent is observed when the velocity is stepped up from an initial 1 m. per minute to 200 m. (using an endless paper strip). However, for a basis weight of 200 gm. per m., this increase is only 0.6 per cent. This is shown in Fig. 2.

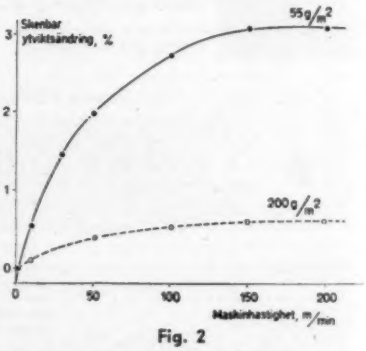
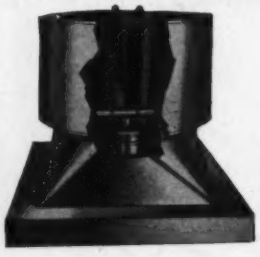


Fig. 2

Strong-Dependable AIR MOVERS for PAPER MILL Ventilation



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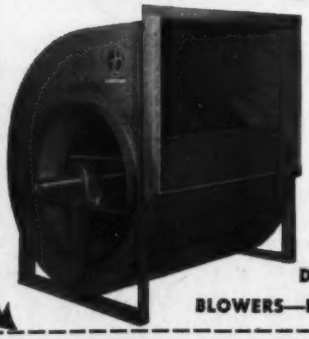

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Variation of the position of the paper web in the gap between the radiation source and the ionization chamber also influences the measurements. The magnitude of this effect, caused by the scattering of the beta particles as they pass through the sheet, will depend upon the "geometry" of the gaps and will increase the error in the basis weight determination by 3-4 per cent when the web is displaced 10 mm. from the position initially occupied when the apparatus was calibrated. This augmented error is obtained in the case of a sheet with a basis weight of 55 gm. per sq. m.

The methods of calibration are discussed. Preferably, the instrument is calibrated by using a running web under conditions simulating operating conditions. The accuracy of the instrument is about 1.5 per cent for basis weight of 50-65 gm. per sq. m. Twenty-nine references. Karl Filip Hansson, *Svensk Papperstidn.*, 56, 590-597 (1953). (Original in Swedish, with an English summary.)

Air in paper stock

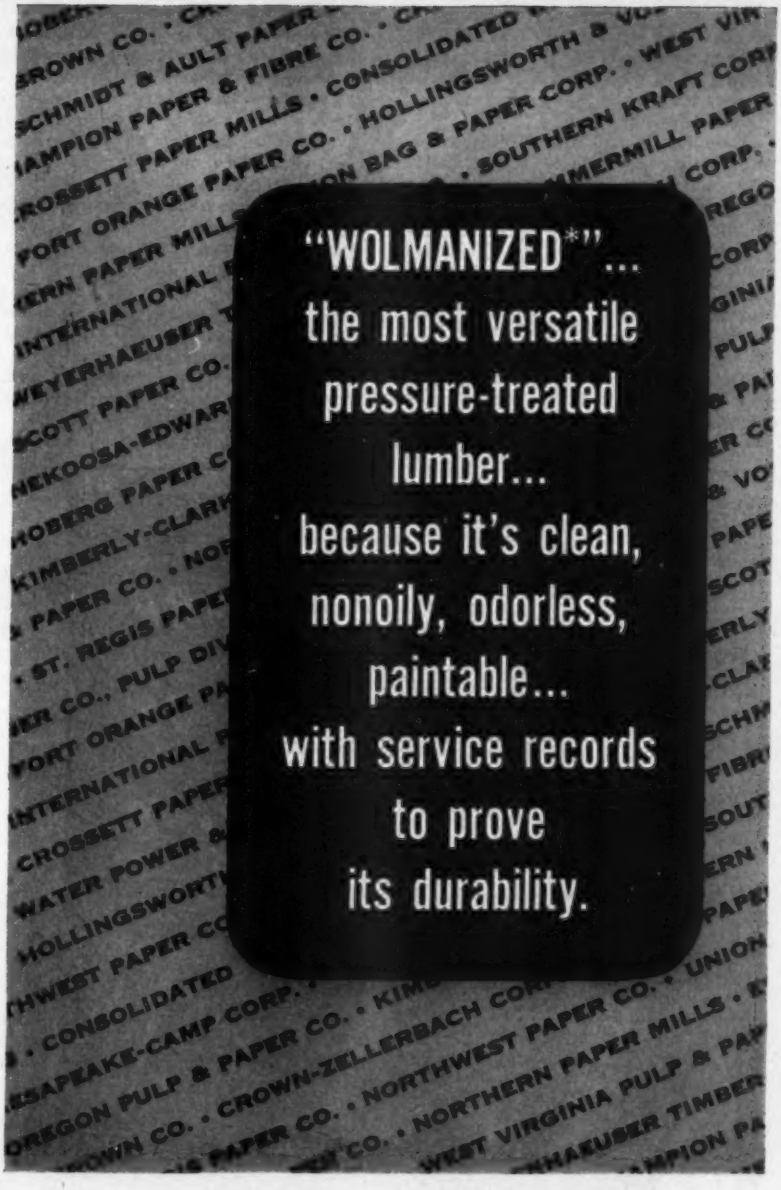
With the increase in machine speeds, air plays an important (but frequently unrecognized) role in the performance of the paper machine. The author traces the effects of air in the stock on the drainage and sheet formation of a fourdrinier machine.

The following areas are considered: air dispersed in the stock during preparation and flow through the headbox; eddies and turbulence in the headbox; the accumulation of air near the slice; the tendency of introducing air between the slice and the breast roll; the presence of an improperly designed or placed forming board; impulse drainage; the functioning of table rolls in the presence of air; the use of inner-roll wire supporting baffles; and the performance of suction boxes.

The author points out that good sheet formation comes as the result of a uniform slice discharge and properly controlled and distributed drainage. The presence of air creates "shock forces" which may damage the sheet structure far more than would even poorly organized drainage in the absence of air. G. I. Goumeniouk. *Canadian Pulp and Paper*, 6, No. 8, 8-10, 25 (August 1953).

Use of polysulfides in cooking maritime pinewood

[In the present work the percentage sulfidity is expressed as 100 times the grams of sodium sulfide per liter, divided by the grams of sodium hydroxide per liter.] At the outset of a normal kraft cook (in France) the sulfidity is approximately 15 per cent, but when the temperature of the cook reaches its maximum (about 170°C) the Na_2S concentration often drops to 3-4 g. per l. Thus, the objective of the sulfate cook (a strong pulp) is in part, at least, lost. In order to increase the concentration of Na_2S at these higher temperatures, the author introduces sodium polysulfide (Na_2S_x) into the white liquor, which is made up as follows. A stock solution is obtained by heating 10 l. 21 per cent NaOH under nitrogen with 3 kg. sulfur at 130-135°C for about 2 hours, cooling the mixture and filtering. This solution then contains 210 g./l. of Na_2S_x, very small amounts



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of Na_2S, and about 60 g./l. of $Na_2S_2O_3$. Prior to the various cooks, this stock solution is diluted with appropriate amounts of aqueous NaOH, which varys depending on the cook that is desired.

The original article contains methods of analyzing the *white liquor* for: total sulfur (A), sulfur (B) present as $Na_2S_2O_3$, and the so-called "active sulfur." In the absence of sulfates, this active sulfur can be found by subtracting B from A, but more direct methods are also suggested. The alkalinity of the white liquor is estimated by titration, making due allowance for the error introduced by the presence of sulfides. In the stock liquor used no sulfates are present.

The author also introduces the new term "apparent Na_2S" (I) which, while not entirely clear, appears to be the sum of the Na_2S originally present in the liquor plus the weight of sulfur computed on the basis of 1 atom S for each mole of Na_2S_x present in the liquor. The terms "apparent alkalinity" and "apparent sulfidity" are also introduced.

Analysis of the *black liquors* includes Na_2S (determined by precipitating Ag_2S) total solids, Na_2CO_3, as well as a fully described potentiometric method for determining Na_2S (based on the earlier work of Borlew and Pascoe, Paper Trade J., 122, No. 10, 31-3, March 7, 1946).

Extensive tabulated data are given for a series of cooks. The tables include liquor analyses, cooking schedules, pulp yields, permanganate and chlorine numbers, pentosans, as well as folding endurance, burst, tensile strength, tear, and basis weights of the pulps.

The effects of varying the alkalinity, on the one hand, and the "apparent sulfidity," on the other, on the pulp quality and pulp yields are determined. The importance of using Na_2S_x in a white liquor is indicated in two cooks. In cook (C) only alkali and Na_2S are used (with a total sulfur content of 1.65 per cent); in cook (D) Na_2S_x is used (the sulfur content being 5.8 per cent). In either case, the pulps obtained show practically identical chlorine numbers and very similar permanganate numbers. However, the pulp from (D) is obtained in higher yield and is by far the stronger. This superiority is maintained when the pulps are bleached, as indicated by the higher degree of polymerization and more satisfactory chain length distribution of pulp from (D).

By using 215 kg. wood in the ordinary kraft cook, the author obtains 90 kg. of (oven dry) pulp. On the other hand, when Na_2S_x is used, the yield of dry pulp is about 137 kg. The advantages seem to be correlated with the conversion of the polysulfide into Na_2S at the maximum cooking temperatures, and at times, at the end of a cook, the black liquor actually retains more Na_2S than is present in the original white liquor.

The author finds no advantages in the presence of $Na_2S_2O_3$ in cooking maritime pine (despite other claims in the literature). The mechanism of Na_2S_x decomposition is discussed at some length. The polysulfide behaves differently in the presence of water than it does when alkali and wood are also present. When only water is at hand the polysulfidè decomposes only partially into Na_2S and $Na_2S_2O_3$, and finally sulfur is also deposited. Actually, the decomposition of Na_2S_x is aided by the presence of NaOH, glass, or porous materials.

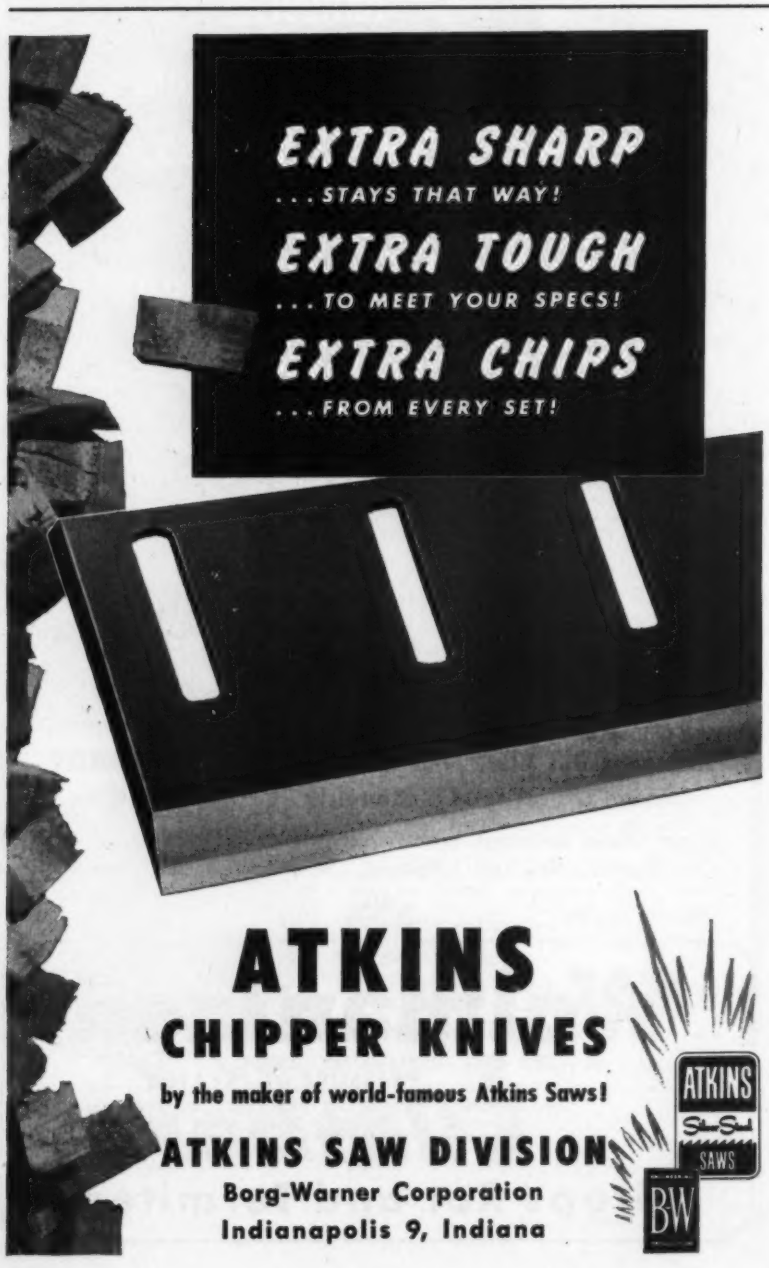
The author also discusses the commercial possibilities of using polysulfides in the kraft cook, but points out that its use may give rise to corrosion problems and also to greater chemical consumption. The possible recovery of sulfur from black liquors is considered. Rene Berthier. *Assoc. Tech. Ind. Papetière Bull.*, 1953, 93-106. (In French.)

Comparison of various brightness testers

The authors, in order to choose the most suitable type of apparatus for a specific purpose, make comparative studies on various instruments, the principles of which are fully explained, with appropriate sketches. The following are tested: the Zeiss Pulfrich photometer, the (sizing and) brightness tester of Brecht and Ziebert, the Photovolt reflection meter, the G.E. brightness tester, the Zeiss Leucometer, the Hoffmann brightness meter (made by Spendler and Hoyer), the Zeiss-Opton "Elko-R" brightness meter, and the Zeiss-Opton Elrepho brightness meter.

The authors have shown diagrammatically, the sensitivity of the various instruments and have discussed the accuracy of their results and the relationship between accuracy and initial cost.

The influences of surface conditions, and the color of the sheets on the brightness of the sample are also outlined. Walter Brecht and Adam Wesp. *Das Papier*, 7, 239-251 (1953). (In German.)



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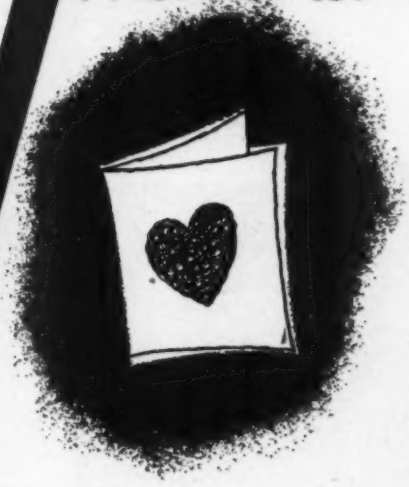

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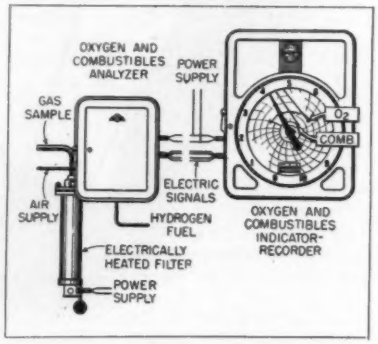

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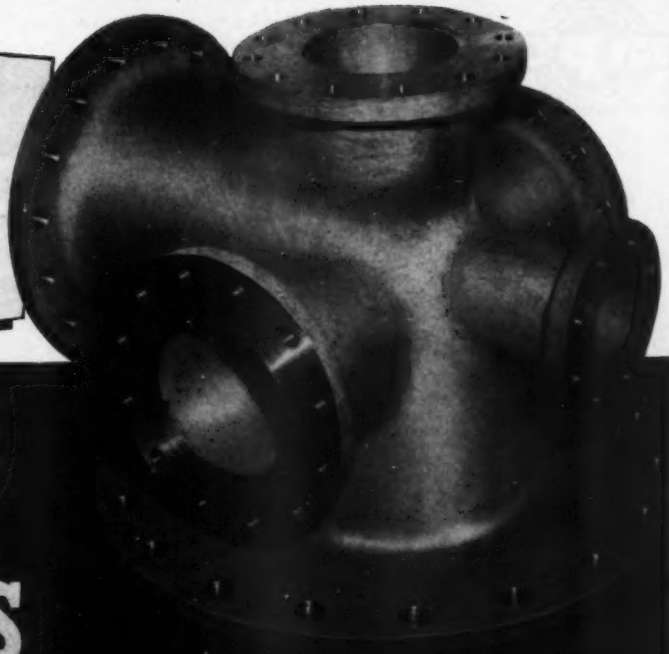

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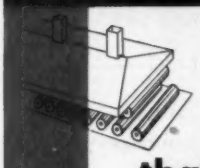

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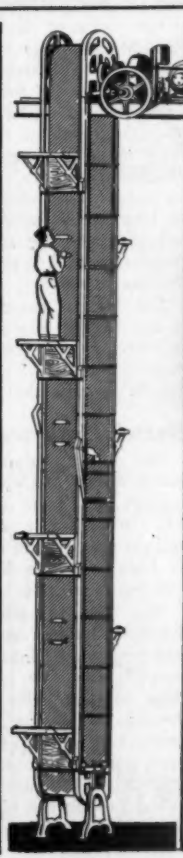

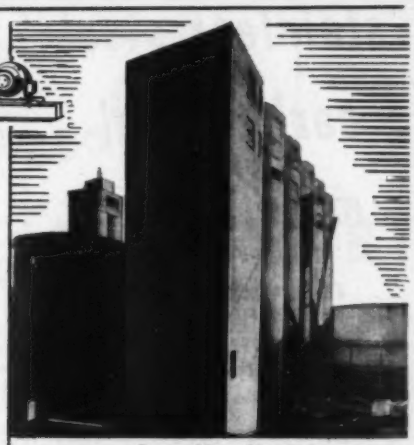

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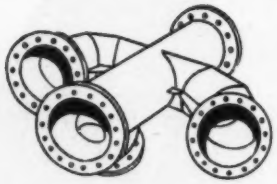

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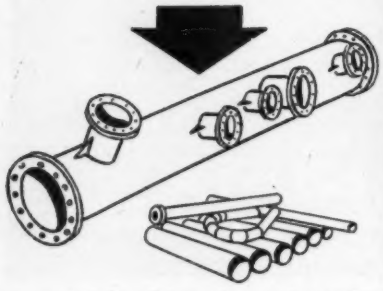

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This lifter is portable and can be made in any practical size in capacities to 4,000 lb. Floor space required is only 8 in. larger than the load itself. *Lewis-Shepard, Dept. R-8, Watertown, Mass.*

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The unique design of the new Spacemaster Model M electric fork truck makes possible right-angle stacking in less than 6-ft. aisles. Because this model is only one-half the usual weight of electric fork trucks, an installation can be made where floor load capacities have been insufficient.

This truck has articulated linkage, i.e., the load carrying section of the truck is joined by sturdy links to the drive unit to smoothly ride over uneven floors. It provides constant drive traction and easier steering. The two outboard stabilizing casters give a total of four points of support under the load (not including the drive wheel), resulting in more stability in transporting and high stacking the load. *Lewis-Shepard, Dept. R-1, Watertown, Mass.*

Rotor

A new Mark II rotor for the E. D. Jones line of Pulp-Masters has been announced. This new rotor, which may be installed in existing pulpers, features improved circulation, more rapid and complete defiberization of the most difficult broke and the hardest pulps. The Mark II rotor accomplishes these results with a marked reduction in horsepower hours per ton, according to the manufacturer. *E. D. Jones & Co., Pittsfield, Mass.*

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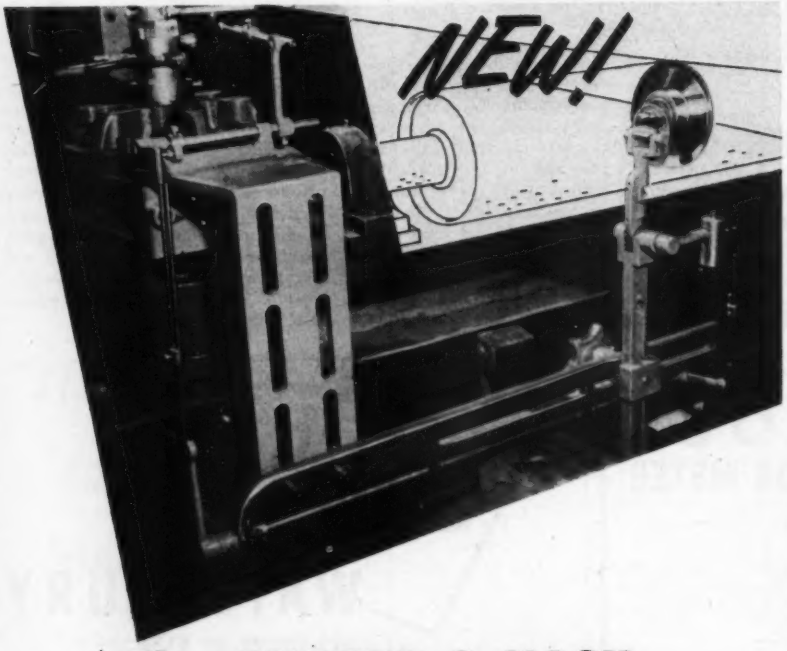

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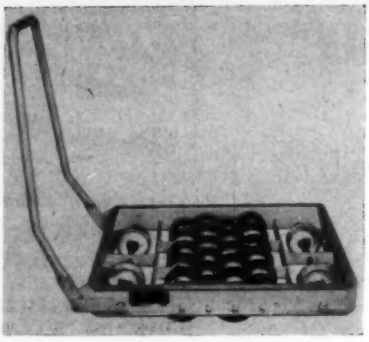

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A newly designed universal pallet dolly rolls and steers over any type floor without swivel casters. Maneuverability, ease of operation, and ability to roll on rough or slatted floors are the advantages of this improved pallet dolly.

Twenty-four six-inch wheels support the load and provide surface contact on rough surfaces. These large diameter wheels are available with rubber tread or aluminum alloy tread to fit operating conditions. Front and rear wheels are mounted on spring loaded axles to assist in guiding the loaded pallet and to allow 360° turning.

Standard production sizes are 30 x 40 in. and 40 x 48 in. Larger sizes can be supplied. *Roll Rite Corp., 801 Jefferson St., Oakland, Calif.*

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RCA industrial television units for televising boiler water level readings as indicated on Yarway flat glass water gages have recently been announced.

The compact viewing monitor, or viewing screen, gives a clear, "live" picture instantaneous with the reading on the gage. The monitor can be mounted on the panel, or at any other desirable location. It is connected by a single cable to the small TV camera aimed at the gage. This camera is mounted on a special base with illuminating bulbs.

The flat glass gage assemblies offer many recent improvements such as the new separated design with interconnecting expansion loops, the Type M illuminator, tie-bar-type water columns, Welbond gage valves, and pressure-sealed "floating assembly" gage glass inserts. *Radio Corp. of America and Yarnall-Waring Co., 7700 Norwood Ave., Philadelphia 18, Pa.*

Fork lift truck

Development of the "Octopus," a 4,000 lb. capacity fork lift truck outfitted with a special carriage and attachments to handle nearly a dozen different types of loads, has been announced.

This truck handles ordinary pallet loads; works as a side-shifting truck to spot loads in "tight" areas and close to columns and walls; hauls and stacks drums and paper rolls, using its clamps; dumps, hauls and stacks tote-box loads; picks up a variety of pallet sizes after automatically adjusting for proper fork-spacing; empties drumloads of bulk material by hydraulically tilting drums in a vertical plane, and lifts bales

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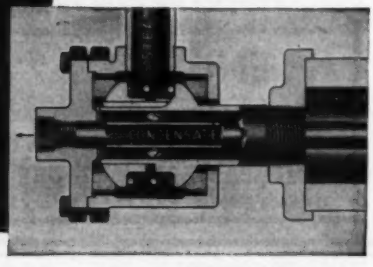

For putting steam in, taking condensate out, Johnson Joints have written an unequalled service record—have been adopted almost unanimously by machinery manufacturers. Now better than ever, the new Johnson Type J Joint weighs less, is smaller, costs less, has new style carbon-graphite seal rings giving an average of 25% greater wear. As before, it's packless, self-lubricating, self-adjusting to varying pressures, easy to service or repair right in the field. The new Type J Joint has simplified head design to permit condensate outlet connection in any direction. The inlet is now on the side of the body, which makes easier both the piping hook-up and the proper centering of the Joint. There's provision for special assembly plate to make easy removal of modern mechanical syphon pipe. Get the facts.

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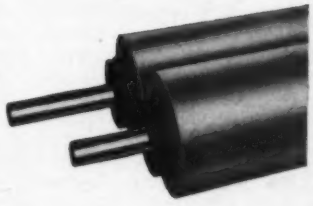

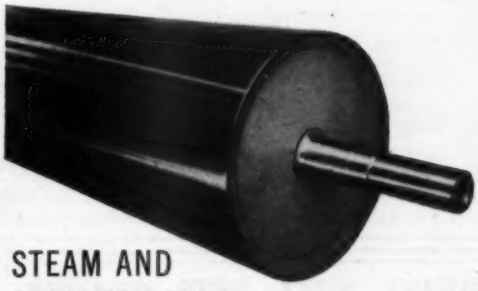

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of cotton and crude rubber with a new spike-clamp attachment.

The assortment of loads is handled nonstop, with just two short pauses for adjustments to the carriage and forks. The "Octopus" is a standard battery-powered fork truck equipped with the Baker 4-purpose carriage. It uses four attachments: a revolving head (semi-permanent), drum clamps, hydraulic drum up-ender, and clamp-spikes (all detachable in two minutes). *Baker-Raulang Co., Industrial Truck Div., 1230 W. 80th St., Cleveland 2, Ohio.*

Waxlike ethylene derivative

A new waxlike, low molecular weight material derived from ethylene, called Alcowax, is planned for use by the packaging, polish and coating industries.

It is reported that, unlike most other polymers of this type, the present grade of Alcowax has waxlike hardness and a melting point of approximately 100° C. It is hard, of white translucent color, and is tasteless, non-toxic and substantially odorless. While having a high melting point, it has a moderately low melt viscosity. It has low density, excellent electrical properties and is compatible with most waxes and waxlike materials. *Allied Chemical & Dye Corp., Semet-Solvay Div., Petrochemical Sales, 40 Rector St., New York 6, N.Y.*

Elevating table

Installed in the basement, the Portelvator elevating table increases production of a ground floor paper sheeting machine by providing the means of handling six-foot stacks of sheeted paper at the delivery end of the machine.

Operated by a 2 hp motor, with reversing magnetic starter, limit switch, and overload protection, the table is push-button operated for a total vertical travel of 78 in. Table size is 48 x 84 in. Load capacity is 3 tons.

In operation, a skid is positioned on the platform of the elevating table and the platform raised to maximum height, 30 in. above floor level. As sheets are received on the skid, the platform is lowered until it reaches its extreme low position, 48 in. below floor level, and then returned to floor level where a fork truck removes the stack to storage. *Hamilton Tool Co., Hamilton, Ohio.*

New Products Briefs . . . . .

GROUND CLAMP—The new, Model GC-200 "Cub" ground clamp has a rated capacity of 200 amps. It features a protruding upper lip for extra leverage in applying the clamp, wide jaws for added conductivity, serrated lower jaw which removes rust and scale as the clamp is applied and assures a clean connection, a strong and fully insulated spring, and simple bolt and clamp connection. The "Cub" makes it possible to shift ground connection easily and quickly to reduce "arc blow" and shorten the welding circuit for current economies. *Tweco Products Co., Box 666, Wichita, Kan.*

TRAILER—A new, all steel welded trailer of 20,000 lb. loading capacity rating, designed particularly for dock and yard service, has been announced. It is designated as Model A-614-10B. *Mercury Mfg. Co., 4044 S. Halsted St., Chicago 9, Ill.*

INSTRUMENT OIL—"Microil," an engineered instrument oil, is specially refined and treated for lubricating small mechanisms, such as micrometers, gauges, relays, and controls of various types. It is processed to eliminate the elements that cause corrosion and does not gum or congeal even at −50° F. *Kano Laboratories, 1000 S. Thompson Lane, Nashville 11, Tenn.*

STEEL FRAMING MATERIAL — "Mult-A-Frame" is a new fully-locking steel framing material with numerous uses that provides skyscraper strength without bulk, according to the manufacturer. Because it is strong and versatile, it can be used to frame, hang, or support virtually anything. Completely reusable, it can be quickly assembled or disassembled. *Mult-A-Frame Div., Ainsworth Manufacturing Corp., 1471 E. Atwater St., Detroit 7, Mich.*

MASKING MATERIAL—A new line of "Quik-Masks" developed specifically for use on anodized surfaces has been announced. These masks, which are made out of Minnesota Mining & Mfg. Co.'s No. 214 paper masking tape, are pre-cut to the exact size and shape of the area that must be protected. They can be readily removed after baking without leaving a trace of residue, it is claimed, and stick without moistening. *W. H. Brady Co., Dept. 361, 1640 E. Spring St., Chippewa Falls, Wis.*

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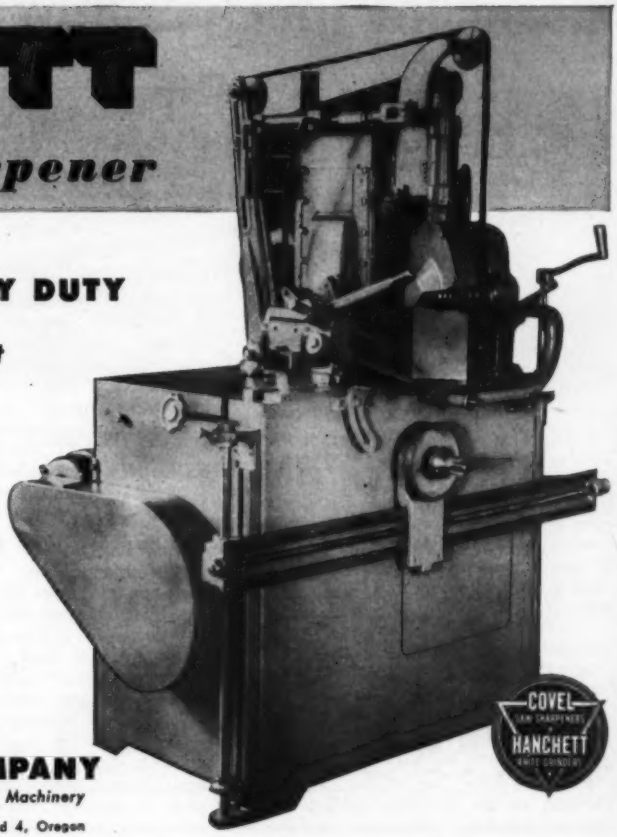

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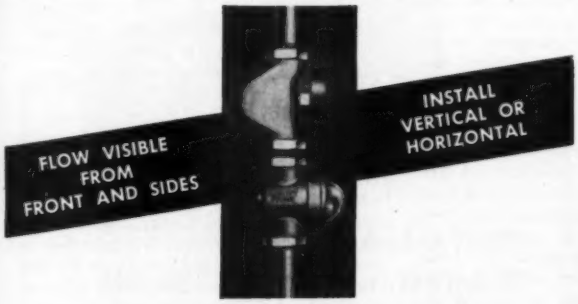

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The Midwest Ball Sight-Flow is the one and only dryer condensate indicator with a "Window" that really stays clear—is constantly being scoured and kept clean by the violence of the liquid as it passes. The thousands already in use on both wet and dry end dryers prove that statement.

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The Paper Industry New Literature

Books

SOLUBLE SILICATES, Their Properties and Uses. Vol. I: Chemistry. (American Chemical Society Monograph No. 116.) By James G. Vail. Published by Reinhold Publishing Co., 330 West 42nd St., New York 36, N.Y. 6¼ x 9¼. 370 pages. $9.00.

This volume is devoted to the theoretical aspects of soluble silicates, covering in detail past and present manufacturing processes, properties of homogeneous and heterogeneous systems of glasses, the formation of metallic silicates and other fundamental material. Both an author index and a subject index are included.

SOLUBLE SILICATES, Their Properties and Uses. Vol. 2: Technology. (American Chemical Society Monograph No. 116.) By James G. Vail. Published by Reinhold Publishing Co., 330 West 42nd St., New York 36, N.Y. 6¼ x 9¼. 685 pages. $15.00.

Devoted to the practical application of silicates in industry today, with helpful references to the underlying theory, this volume describes the film-forming properties of silicates and their uses in all types of industrial materials and techniques, including adhesives, laminates, sizing, fire protection, cements, plastics, etc. The author has gone into great detail on the use of soluble silicates in sols and gels, their properties as catalysts, protective agents, stablizing materials, and coagulation aids.

Nearly all ideas are expressed in simple English with a minimum of mathematical or highly specialized language. Both an author index and a subject index are included.

WOOD PULP STATISTICS. 1953 edition. Published by United States Pulp Producers Association, Inc., 122 East 42nd St., New York 17, N. Y. 9 x 11¼. 250 pages. $10.00. Paperbound.

This annual publication is a long-range record of the trend and pattern of wood pulp supply and demand in the major producing and consuming countries of the world. Compiled from widely scattered sources, this record brings together in a single source book information basic to an understanding of world pulp and paper markets. Mr. J. L. Ritchie, executive director of this association, states in the foreward that every effort has been made to present the data in a form that will facilitate economic analysis and focus attention on basic trends and relationships.

The first two pages of this book are devoted to an explanation of terms. The remainder of the book is divided into three sections. The first section, covering the United States, provides statistics on wood pulp capacity, production, domestic sales, new supply, consumption, inventories, imports, exports, prices, and a summary. Also included in this section is information on pulpwood consumption, receipts, and inventories; and paper capacity, production, imports, exports and new supply.

Section II presents similar information on wood pulp for 31 foreign countries, and Section III gives world summaries for wood pulp and rayon. Many graphs are included.

Booklets and Pamphlets

REPRODUCTION ON CUT-OVER SWAMPLANDS IN THE UPPER PENINSULA OF MICHIGAN. (Station Paper No. 27.) Published by Lake States Forest Experiment Station, University Farm, St. Paul 1, Minn. 8 x 10½. 18 pages. Included in this booklet are the following topics: a summary of results of this survey; an explanation of why such a survey was needed; brief reviews of several previous reproduction surveys in swamp types; survey method and data interpretation; reproduction survey results on peat soils, Carbondale muck, and on wet and poorly drained mineral soils; effects of brush and slash on reproduction, and need for more research. A list of the common and scientific names of trees mentioned in the text is given. Nine tables are included. Station Papers issued from 1946 to 1952 are listed.

FOREST FIRES AND FOREST FIRE CONTROL IN WISCONSIN. By J. A. Mitchell and Neil LeMay. Published by Wisconsin State Conservation Commission in cooperation with United States Department of Agriculture, Forest Service. 6 x 9. 75 pages. This booklet tells the story of forest fires in Wisconsin from the days when they raged unchecked to the present, reviews the development of protection effort, and outlines the present situation. While primarily for local information, it deals with a common problem and shows what can be accomplished by organized protection effort.

YOUR CAREER IN PACKAGING. Published by the Department of Forest Products, Michigan State College, East Lansing, Mich. 4 x 9. 6 pages. This folder describes the opportunities in the packaging field and outlines in detail the packaging curriculum at Michigan State College.

MODERN STEEL BOLTING FOR PIPING AND PRESSURE VESSELS. (Bulletin 524). By C. M. Vogrin, Frank S. G. Williams, and John S. Worth. Published by Taylor Forge & Pipe Works, P.O. Box 485, Chicago 90, Ill. 8½ x 11. 18 pages. Reprinted from the American Society of Mechanical Engineers Paper No. 52-PET-7, this booklet contains comments on each ASTM specification, in addition to tables on the compilation of properties and bolting selection. Also included is a discussion on the behavior of bolted flanged connections of the types used in piping and pressure vessels.

THE PREPARATION OF COATING COLOR (Technical Bulletin No. 832). By Karl Wille. Published by American Cyanamid Co., Calco Chemical Div., Bound Brook, N.J. 9 pages. The introduction of this booklet discusses the many factors which must be considered in the production of a satisfactory sheet of coated paper. It goes on to present a short history of coated papers from 1850 up to the present time. The preparation of casein and starch adhesives is discussed in detail. Part III covers the preparation of white and colored pigment slurries before the addition of casein, and Part IV deals with the preparation of coating colors containing casein and coating mixes containing starch.

SYMPOSIUM ON DETERMINATION OF ELASTIC CONSTANTS (Special Technical Publication No. 129). Published by American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 6 x 9. 100 pages. Paperbound. $2.00. The series of papers in this booklet were presented at the 55th annual meeting of the American Society for Testing Materials in June 1952. The symposium is opened by an analysis of returns from a questionnaire on the needs regarding elastic constants and on current practice in their determination. Four other papers cover the following: a static method for modulus determinations at elevated temperatures and its application to steels; static and dynamic methods for nonmetals; dynamic methods with their advantages and limitations, and a comparison of values of elastic constants for a beryllium-copper alloy obtained by several static and dynamic methods.

PLANT MAINTENANCE (PB 106470). Published by U.S. Department of Commerce, Office of Technical Services, Washington 25, D.C. 80 pages. 65 cents. The report of a British productivity team surveying plant maintenance in the United States is a handbook of basic principles, which cover the purpose of maintenance and its place in industry, maintenance group organization, maintenance planning and statistical control, application of work study to maintenance, the authorization of maintenance and budgetary control, control costing for maintenance, maintenance techniques and design for maintenance, and maintenance personnel.

A STUDY OF THE BEATER. Second edition. By Samuel Milne. Published by E. D. Jones & Co., Pittsfield, Mass. Both the

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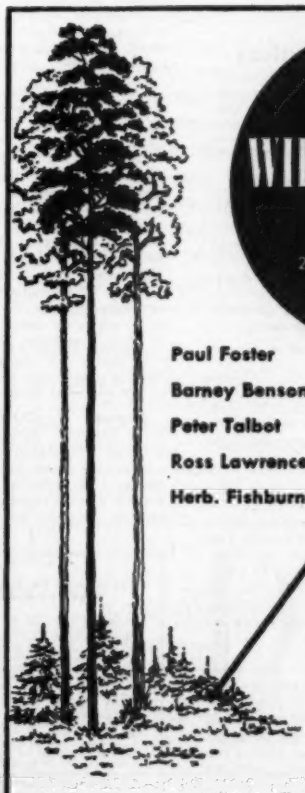

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original paper read by Mr. Milne to the Technical Association of the Papermakers' Association of Great Britain in 1927 and his further notes reviewing the changes in beater design and practice between 1927 and 1940, the publication date of the first edition, are reproduced without change. The third section of the book consisting of detailed supplementary notes on the study, by Dwight E. Jones, has been completely revised. The booklet is replete with illustrations (many of them new) of beaters and beating units, and numerous sketches, charts and formulae of special interest to the technical man, tables for calculating beater loading, etc.

Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.*

Mobile Cranes. Coles Cranes, Inc., P. O. Box 942 P.I., Joliet, Ill.—This 8-page bulletin describes mobile cranes, listing specifications and lifting capacities of six different models. Safety features are illustrated and described, as well as other features and advantages. The power unit and chassis construction are illustrated and parts labelled. Numerous photographs shows the cranes in operation in various industries.

Fork Truck Attachment. Lewis-Shepard, Watertown, Mass.—A new 2-page bulletin describes the "Side Shifter" electric fork truck attachment, explaining what it does, and how it works. Dimensions and capacity are given. Photographs are included.

Laboratory Appliances. Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.—Fisher's line of clamps, holders and supports is the subject of new Catalogue FS-228. The appliances are made of Castaloy, an alloy with a tensile strength of 47,000 psi. In addition to all of the conventional appliances, the 24-page booklet lists a large variety of special-purpose clamps devised by chemists in industrial laboratories.

Gravity Filters. Permutit Co., 330 West 42nd St., New York 36, N. Y.—A comprehensive and well illustrated 24-page booklet (No. 2539A), which should be of interest to all operating, consulting and architectural engineers dealing with water problems, shows the complete line of gravity filters made in three basic types of concrete, of steel, and of wood. Specifications, operating characteristics, outline dimensions and typical installations of these filters and associated accessories have been included in this new edition.

Short Range Paper Selector Chart. R. P. Cargille Laboratories, Inc., 117 Liberty St., New York 6, N.Y.—An aid to pH testing is the "Ready Reference Selector Chart" for selecting the appropriate Hydrion pH test papers for testing at any point on the pH scale. This chart shows at a glance the points on the pH scale at which 20 Hydrion pH test papers show 97 positive color changes.

Diatomite. Johns-Manville, 22 East 40th St., New York 16, N.Y.—This new 28-page brochure, "Celite—The Story of Diatomite," is designed for both laymen and technical men, and uses photographs and drawings, as well as text, to trace the development of diatomite. The story begins with a history of the origin of diatom, the discovery of this deposit, and the experiments which have led to the still-multiplying uses of diatomite today. The succeeding sections describe the current benefits of diatomite, including its use as a mineral filler in the manufacture of paper. The story concludes with a brief prediction of new things that may be expected.

Temperature Controls. Burling Instrument Co., 5 Vose Ave., South Orange, N.J.—4-page condensed Catalogue G-18 presents a general description of all Burling electric temperature controls, pictures of all models, including the new low-priced Models A-18 and B-1C, and a separate description of the pneumatic and valve-type controls. For the first time a compresensive selection and comparison table has been added, showing the essential features of each of the 17 electrically operated temperature controls. Included are the one, two, and three switch models.

pH & Conductivity Recorders & Controllers. Minneapolis-Honeywell Regulator Co., Industrial Div., Station 64, Wayne & Windrim Aves., Philadelphia 44, Pa.—24-page Catalogue 1550 describes and gives details on measurement and control of pH, Redox, and conductivity. It includes the easy-to-understand theory behind electro-chemical measurement and gives up-to-date information on recorders, controllers, amplifiers and electrodes. The catalogue also contains information on where and how to use automatic pH, Redox, and conductivity measuring and controlling equipment.

Combustion Chambers. National Carbon Co., Div. of Union Carbide & Carbon Corp., 30 East 42nd St., New York 17, N.Y.—New Catalogue Section S-7530 covers graphite combustion chambers with "Karbate" brand impervious graphite burner nozzles. This complete processing unit is fully illustrated and described, with detailed suggestions and recomendations for its use in the burning of wet hydrogen and chlorine gases from diaphragm cells, in the burning of "sniff gas" with wet or dry hydrogen, or in the burning of re-evaporated chlorine, dried but not compressed chlorine, or cooled but not dried chlorine from mercury cells with wet or dry hydrogen. Dimensioned engineering drawings show the construction of the combustion chambers and burner nozzles. Tables of dimensional sizes and capacities are given.

Control of Chemical Feeders. Foxboro, Co., Foxboro, Mass.—Improved processing through automatic control of chemical feeders is described in a new engineering data sheet, AED 000-10. Separate sections of the 4-page illustrated folder describe feeder control in relation to flow rate, changing the feed rate by ratio-set mechanism, range of ratio adjustment, and control of pH under conditions of wide and narrow flow variations.

Boiler Tubing. Babcock & Wilcox Co., Tubular Products Div., Alliance, Ohio—Known as TDC-137A, a new data card tabulates the present day prices per 100 feet of electric-resistance-welded carbon steel boiler tubing in various quantity brackets. Seventy-seven popular sizes are shown in the table. Also included are weights per foot and footage required of each particular size to reach a given quantity bracket.

Safety Posters. Baker Raulang Co., Baker Industrial Truck Div., 1230 West 80th St., Cleveland 2, Ohio—A new series of 8 safety posters designed to remind industrial truck operators of safe driving and operating practices has recently been produced. Printed in color on 14 x 22-inch sheets, the posters are done in a bold cartoon style. The tag-line, "Be Smart—Be Safe," appears on each poster. "High-stack with care," "Know your clearances," "Watch load limits," and "Always brake carefully" are typical subjects treated in the new series.

Copper & Brass Products. Chase Brass & Copper Co., Waterbury 20, Conn.—This new file-size bulletin lists nearly 70 catalogues and technical handbooks on copper and brass products. Publications in the listing include descriptions of copper and copper engineering alloys, copper bus conductors, copper wire, cable and magnet wire, copper water tube and fittings, brass and copper building products, copper tube and fittings for radiant heating, condenser and heat exchanger tubes, brass and copper industrial wire cloth, brass and copper rivets, burs and washers, and pipe and tube products.

Tube Mills. Hardinge Co., Inc., 240 Arch St., York, Pa.—Bulletin No. 18-B, comprising 12 pages, describes Hardinge's line of tube mills for grinding and pulverizing. It discusses the application, construction, and specifications for the pebble tube mill and the ball tube mill. It also illustrates several types of compartment mills.

Magnetic Motor Starters. Arrow-Hart & Hegeman Electric Co., 103 Hawthorn St., Hartford 6, Conn.—This 8-page bulletin describes the new Type "RA-V" magnetic motor starters with vertical overloads below contactor. The uses of the new motor starter are completely described. The bulletin is fully illustrated and includes design features, size and weight data and other information of interest to the engineer.

Electric Dehumidifiers. Remington Corp., Air Conditioning Div., Auburn, N. Y.—This 6-page bulletin (No. 531) enables any plant superintendent or other executive to determine the minimum dehumidifying equipment and capacity needed to eliminate moisture problems. It contains simple tables of all necessary technical information and complete, step-by-step instructions for solving moisture removal problems at lowest equipment and operating costs. The bulletin lists 21 of the many categories such as industrial plants, warehouses, storage facilities, etc., where excessive humidity or moisture in the air causes costly damage. Prepared from experience gained in designing and manufacturing the "Moisture Magnet" electric dehumidifier, the bulletin uses the case history method. The user follows the steps leading to the solution of a moisture problem in a hypothetical plant.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, AND CIRCULATION REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946
(Title 39, United States Code, Section 233)

Of THE PAPER INDUSTRY published monthly at Mount Morris, Illinois for October 1, 1953.

1. The names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Fritz Publications, Inc., 431 S. Dearborn St., Chicago, Ill.; Editorial Director, A. W. J. Dyck, 431 S. Dearborn St., Chicago, Ill.; Business manager, A. Scott Dowd, 431 S. Dearborn St., Chicago, Ill.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.) Fritz Publications, Inc., 431 S. Dearborn St., Chicago, Ill.; Mrs. Annie C. L. Fritz, 6801 Crandon Ave., Chicago, Ill.; Mr. A. Scott Dowd, 6801 Crandon Ave., Chicago, Ill.; Miss Abigail C. Bruce, 2446 Oak Park Ave., Berwyn, Ill.

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4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs shows the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

A. SCOTT DOWD, Business Manager.

Sworn to and subscribed before me this 23rd day of September, 1953.
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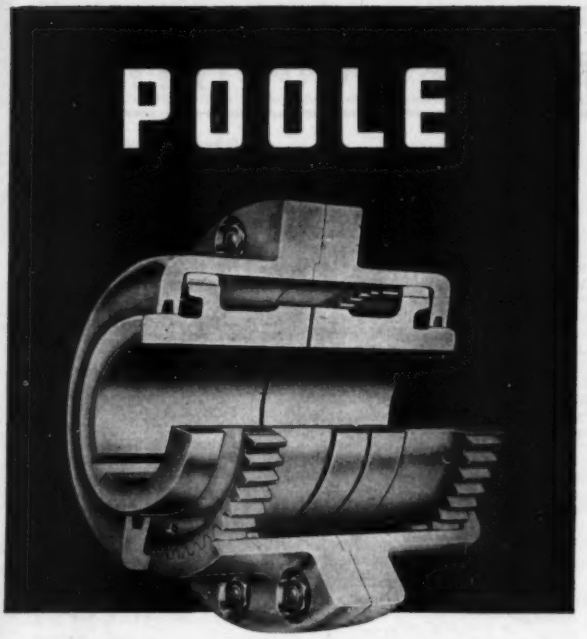
(My commission expires Dec. 26, 1956.)



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FLEXIBLE COUPLINGS

POOLE FOUNDRY & MACHINE COMPANY WOODBERRY, BALTIMORE, MD.

CARTHAGE MACHINE CO.

• • •

Machinery for Ground Wood and Chemical Pulp Mills.

CARTHAGE, NEW YORK

POSITIONS OPEN—MEN WANTED

We have positions right now for managers, supts., asst. supts., foremen for all depts., chemists, master mechanics, plant engineers.

CONFIDENTIAL EMPLOYMENT SERVICE

for paper mills, pulp mills and paper converting plants, serving employers seeking executives and executives seeking positions. We welcome your inquiries.

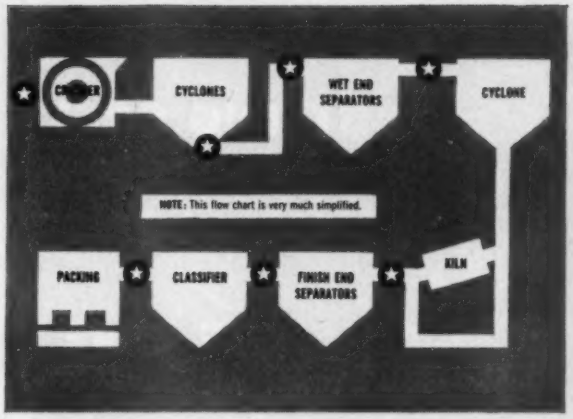
CHARLES P. RAYMOND SERVICE, Inc.

Phone: LIberty 2-6547 294 Washington St. Boston 8, Mass.

WANTED—2 synchronous motors, 1000 to 1500 hp, 300 rpm, for 4160 volt, 3 phase, 60 cycle, A.C. When offering, include complete nameplate data including serial numbers. Address: Box 558, The Paper Industry.

WANTED—Single or duplex head ream cutter for tissue papers suitable to accommodate and cut sheets 126" wide from 24 rolls at one time. Back stands are desired but not required. When quoting, give complete information and specifications including manufacturer's name and serial number. Address: Box 559, The Paper Industry.

WANTED—Pulpwood grinders with or without electric motors. When offering, give complete information and specifications including manufacturer's name and serial number. Address: Box 560, The Paper Industry.



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. . . in the most conscientious quality-control system yet devised – beginning with crude selection and ending only when products pass the final test-run on a thief sample *after* bagging.

Actually, these stars represent only major "check points" in what is esentially a continuous quality control system, "built in" to the most modern processing plant ever engineered for the diatomaceous silica industry*. So exact are the controls on every step that processing can be held within narrower limits than were ever practicable before.

To you, this means even higher quality Dicalite – assurance that every sack of every Dicalite product will be uniform in particle size, particle range and distribution, and in other physical and chemical properties. Whether your processing involves filtration, filler materials, extenders, diluents, carriers, or absorbents, DICALITE's unvarying top quality gives you better processing, better products.

*If you'd like to see the more detailed flow sheet of DICALITE's new Lompoc plant, and learn more about how top quality in diatomite products is achieved, write today for your free reprint of the feature article in the February issue of Industrial & Engineering Chemistry. Write Great Lakes Carbon Corporation, Dept. F-3711-612 So. Flower Street, Los Angeles 17.

Dependable GREAT LAKES **Dicalite®** DIATOMACEOUS MATERIALS

DICALITE DIVISION • GREAT LAKES CARBON CORPORATION

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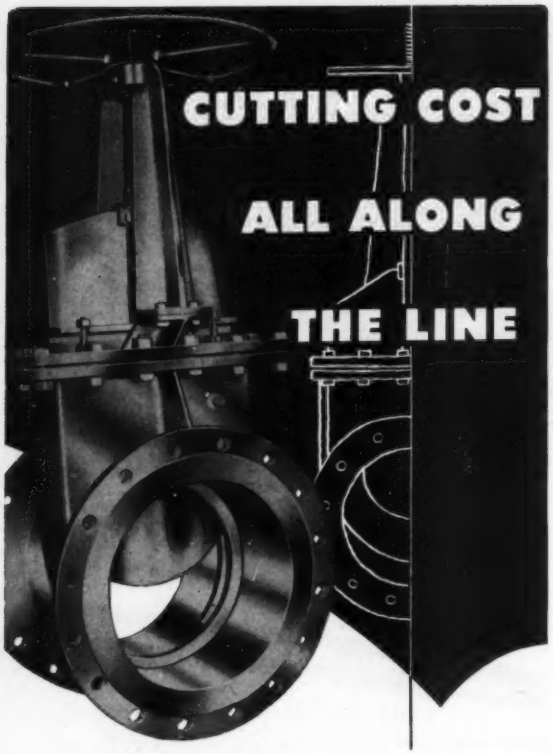

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Fabri-Valve's more economical construction saves on original price . . . installation and shipping cost. Sizes 2" to 24" Fabri-Valves carried in stock . . . custom made orders filled in 30 days. Contact your nearest dealer for details on how Fabri-Valves will cut your production cost.

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MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

The following are quotations to mills, f.o.b. New York:

No. 1 White Shirt Cuttings	11.50 to 12.50
New Unbleached Muslins	13.50 to 14.50
Fancy Shirt Cuttings	6.75 to 7.00
No. 1 Percales	6.75 to 7.00
No. 1 Washables	3.25 to 3.50
No. 1 Light Silesias	7.25 to 7.50
No. 1 Light Prints	6.00 to 6.25
Light Flannelettes	7.25 to 7.50
Cottonades	4.00 to 4.25
Blue Overalls	6.75 to 7.00
Blue Cheviots	6.75 to 7.00
Canton Flannels, Bleached	11.00 to 11.50
Canton Flannels, Unbleached	11.00 to 11.50
Osnaburg Cuttings	8.00 to 8.50
Underwear Cuttings, Bleached	14.00 to 15.00
Underwear Cuttings, Unbleached	14.00 to 15.00
Khaki Cuttings—	
Sun Tan	7.00 to 7.50
Mixed	3.75 to 4.00
Linen Cuttings—	
American	7.50 to 8.00
White	13.00 to 14.00
Grey	13.00 to 14.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Roofing—	
No. 1	1.25 to 1.35
No. 2	.95 to 1.05
No. 3 and 4	.80 to .90
Twos and Blues—	
Repacked	2.25 to 2.50
Thirds and Blues—	
Repacked	2.00 to 2.25
Miscellaneous	1.75 to 2.00
Whites, No. 1—	
Repacked	5.25 to 5.50
Miscellaneous	4.50 to 4.75
White, No. 2—	
Repacked	4.25 to 4.50
Miscellaneous	3.50 to 3.75

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	4.50 to 4.75
Domestic	4.75 to 5.00
Wool Tares—	
Light	5.50 to 5.75
Heavy	5.75 to 6.00
No. 1 Scrap Bagging	3.75 to 4.00
Manila Rope—	
No. 1 large	7.00 to 7.50
No. 1 small	6.00 to 6.50
Sisal Rope—	
No. 1 large	6.00 to 6.25
No. 1 small	5.50 to 5.75
New Burlap Cuttings	6.00 to 6.50
Jute Threads—	
Foreign (Nom.)	6.00 to 6.50
Domestic	6.25 to 6.75
Strings—	
No. 1 sisal	5.25 to 5.50
No. 2 sisal	4.75 to 5.00
Soft jute	5.25 to 5.50
Mixed	3.00 to 3.25

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

	per ton
Shavings—	
Hard White Env. Cuts	115.00 to 125.00
Hard White No. 1	90.00 to 95.00
Soft White, one-cut	75.00 to 80.00
Soft White, No. 1	55.00 to 60.00
Coated Soft	40.00 to 45.00
Fly Leaf No. 1	25.00 to 30.00
Fly Leaf, Woody No. 1	25.00 to 30.00
No. 2 Mixed Col. Woody	20.00 to 25.00
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	22.00 to 24.00
Mixed Books	16.00 to 17.00
Ledger Stock—	
No. 1 White	55.00 to 60.00
No. 1 Mixed (Colored)	40.00 to 45.00
Manilas—	
New Env. Cuttings	65.00 to 70.00
New Env. Cuts, One-Cut	
Extra Manilas	22.50 to 25.00
Manila Tab Cards, Free of Ground Wood	65.00 to 70.00
Colored Tab Cards	45.00 to 50.00
Kraft—	
New Envelope Cuttings	65.00 to 70.00
Tripled Sorted No. 1 100%	37.50 to 42.50
No. 1 Old Assorted	27.50 to 32.50
News—	
White Blank	55.00 to 60.00
Overissue	22.00—
No. 1 Folded	16.00—
Old Corrugated Containers	23.00—
New Jute Corrugated Cuts	26.00—
Mill Wrappers	18.00—
New Board Chips	14.00—
No. 1 Mixed Paper	13.00—

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.55—
Ground, cwt.	3.85—
Powdered, cwt.	4.70—
Blanc Fixe—	
Pulp, bulk, ton	100.00—
Dry, barrels	105.00—
Bleaching Powder—	
Drums, cwt.	5.00 to 6.00
Casein (Domestic Standard)	
20-80 mesh (bags), lb.	
80-100 mesh (bags), lb.	28.00—
Argentine, lb.	23.00—
China Clay—	
Domestic Filler Bulk (mine) ton	10.00 to 15.00
Domestic Coating Bulk (mine) ton	17.00 to 25.00
Imported (ship side) Bulk (lump) ton	20.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	2.93—
Gelatine (silicon), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	41.00—
Litharge, powd. bbl. lb.	.15½ to .16

MARKET QUOTATIONS

Rosin (Gum)—	New York, per 100 lbs.
E	8.65—
F	8.65—
G	8.65—
WW	8.80—
Rosin (Wood), carlots, F.O.B. South	6.50—
Salt Cake—	
Dom. bulk (wks) ton	19.00 to 23.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	22.00—
Soda Ash—	
Bulk (works) cwt.	1.45—
Paper bags, cwt.	1.75—
Soda (Caustic)—	
Solid drums, cwt.	3.70 to 4.45
Ground and flake, drums, cwt.	4.10 to 4.85
Sodium Silicate—	
60 deg. 55 gal. drums, (works) cwt.	1.60 to 1.70
40 deg. 35 gal. drums, (works), cwt.	1.35 to 1.40
Starch—	
Pearl, 140 lb. bags, cwt.	6.30—
Pearl, barrels, cwt.	6.30—
Paper (Sp.) bags, cwt.	6.30—
Powdered, barrels, cwt.	6.00—
Sulphur (Crude)	
(Mine) bulk, long ton	25.50 to 27.50
Talc—	
Dom. 100 lb. bags (mine) ton	25.00 to 28.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig, bbls., lb.	.22½ to .23
Calcium Pig, bbls., lb.	.22½ to .23
Zinc Sulphide, bbls., lb.	11.50 to 12.00

WOOD PULP

Quotations on domestic and Canadian wood pulp, dollars per short air dry ton, delivered consuming mills including basic freight allowances, follow:

Bleached Sulphite	140.00—
Bleached Sulphite, Canadian	140.00—
Unbleached Sulphite	120.00—
Unbleached Sulphite, Canadian	120.00—
Bleached Soda	140.00—
Bleached Soda, Canadian	140.00—
Kraft, Bleached	145.00—
Kraft, Bleach., Southern	142.50 to 150.00
Kraft, Bleach., Canadian	145.00 to 150.00
Kraft, Unbleached, Northern	132.50—
Kraft, Unbleached, Southern	95.00 to 105.00
Kraft, Unbleached, Canadian	100.00 to 125.00
Kraft, Semi-Bleached, Southern	140.00—
Sulphite Screenings	72.50—
Sulphate Screenings	67.50—
Groundwood	82.50 to 87.50

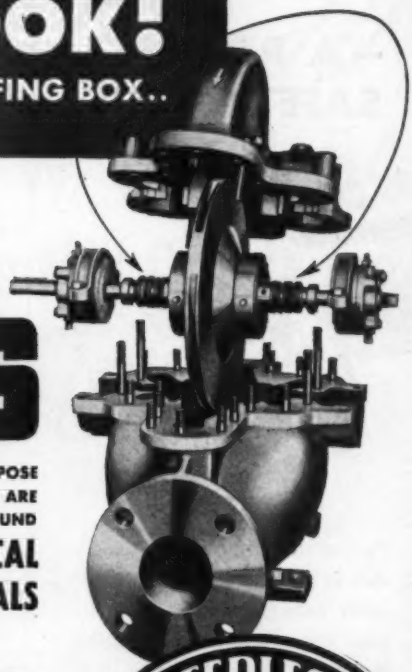
Quotations on imported wood pulp, dollars per short ton, on dock American Atlantic ports with varying freight allowances, follow:

Bleached Sulphite, Swedish	130.00 to 140.00
Bleached Sulphite, Norwegian, freight allowed	140.00—
Bleached Sulphite, Finnish, freight allowed	140.00—
Unbleached Sulphite, Swedish	110.00 to 115.00
Unbleached Sulphite, Finnish, freight allowed	120.00 to 125.00
Kraft, Unbleached, Swedish	100.00 to 105.00
Kraft, Unbleached, Finnish, freight allowed	105.00 to 135.00
Kraft, Bleached, Swedish, on dock	137.50 to 142.50
Kraft, Bleached, Norwegian	

PAPER

Boards—	
Prices per ton, delivered, 10 tons or more:	
Plain Chip	85.00—
News vat lined chip	97.50—
Filled news	87.50—
Solid news	90.00—
White vat lined chip	135.00—
Chip tube and can stock	100.00—
Single manila lined chip	140.00—
Single jute lined chip	135.00—
Kraft liner	122.50—
White patent coated:	
.020	160.00—
.018	162.50—
.016	165.00—
Book Paper—	
Coated two sides	
70 lb. No. 2 enamel, 25x38-500, trimmed 4 sides	4 cases $17.25 Carloads $16.30
45 lb. enamel, 25x38-500, trimmed 4 sides	4 cases $13.05 Carloads $12.10
Uncoated	
55 lb. No. 2 offset, 25x38-500, trimmed 4 sides	4 cases $14.80 Carloads $13.85
50 lb. A Grade English Finish, 25x38-500, untrimmed	4 cases $14.05 Carloads $13.10
20 lb. envelope, 17x22-500, untrimmed	Carloads $12.40
16 lb. tablet, 17x22-500	Carloads $11.35
Rag Content Bond—	
Extra 100% rag	70.45—
100% rag	62.65—
75% rag	48.15—
50% rag	38.90—
25% rag	31.75—
Rag Content Ledger—	
Extra 100% rag	72.65—
100% rag	63.90—
85% rag	52.50—
75% rag	49.40—
50% rag	40.20—
25% rag	33.00—
Sulphite Bond—	
Air dry bond (Watermarked)	19.00—
No. 1 bond (M.F. watermarked)	15.00—
No. 2 bond (M.F. watermarked)	14.00—
Plain bond (M.F. unwatermarked)	14.00—
Sulphite Ledger—	
No. 1, M.F. watermarked	20.50
No. 2, M.F. watermarked	19.50
Plain, M.F. unwatermarked	19.00
News—	per ton
Rolls, Standard (Contract)	125.00 to 126.00
Rolls (Spot)	(Nominal)
Sheets	138.00—
Tissues (Carlots)—	per ream
White No. 1	1.75—
White No. 2	1.35—
Bleached Anti-Tarnish	2.20—
Colored	2.00—
Anti-Tarnish Kraft	1.65—
Manila	2.00—
Napkins, semi-crepe (12¼ lb. to M shts.) per cs.	.90—
Napkins, full crepe and embossed (12½ lb. to M shts.) per cs.	.90—
Toilet, Bleached (M shts.) per cs.	9.35—
Toilet, Unbleached (M shts.) per cs.	7.90—
Towels	per case
Bleached	6.80—
Unbleached	5.90—
Wrappings (Kraft)—	per cwt.
Standard wrapping	8.00—
Butchers, counter rolls	8.50—
Standard bag, mill rolls	7.75—
Shipping sack, mill rolls	8.00—
Gumming, mill rolls	8.25—
Asphalting, mill rolls	8.00—
Envelope, mill rolls	9.50—

LOOK!
NO STUFFING BOX..



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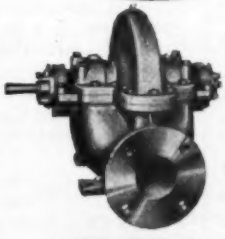

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4. EASILY SERVICED. Entire rotating element can be removed from pump without disturbing line connections. Shaft seals and bearings are standard items, easily available from commercial sources.

WRITE FOR BULLETIN No. B-1350 which completely describes and illustrates the modern design and construction features of Peerless Type AS pumps.

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Please send us a copy of Bulletin No. B-1350 describing Peerless Type AS pumps.

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—A POTENT SAFETY TOOL

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The National Safety Council maintains a stock of posters that covers all industries, operations and phases of safety and health. These posters are produced in three sizes: "A" size, 8½" x 11½"; "B" size, 17x23"; and "C" size, 25x38". Their colorful illustrations and eye-catching captions make them ideal for the mass selling of safety.

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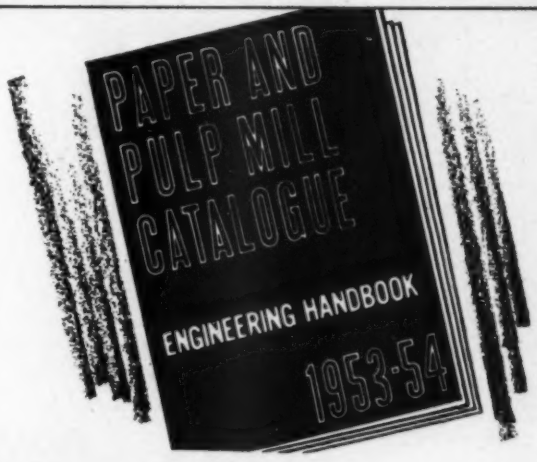

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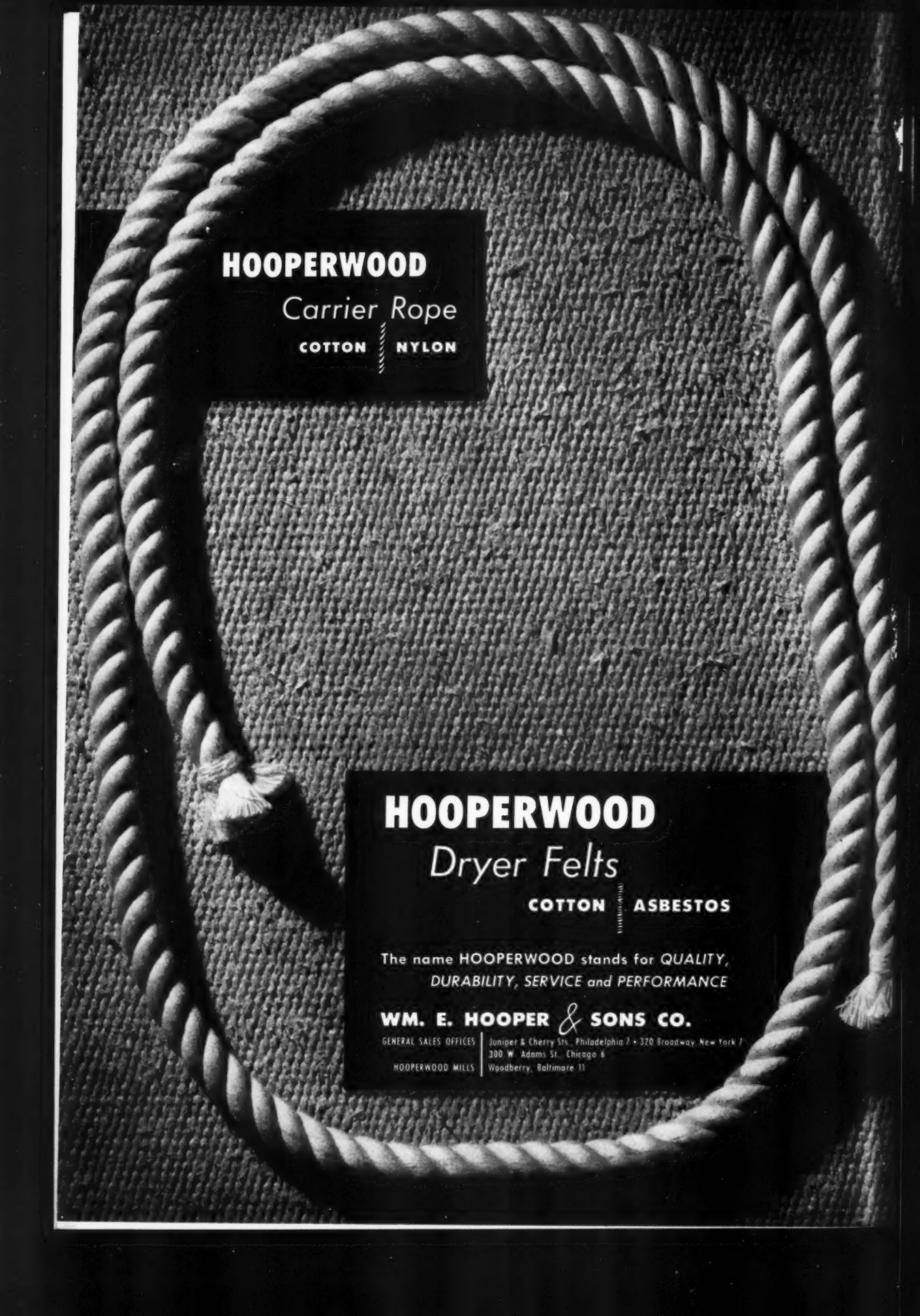
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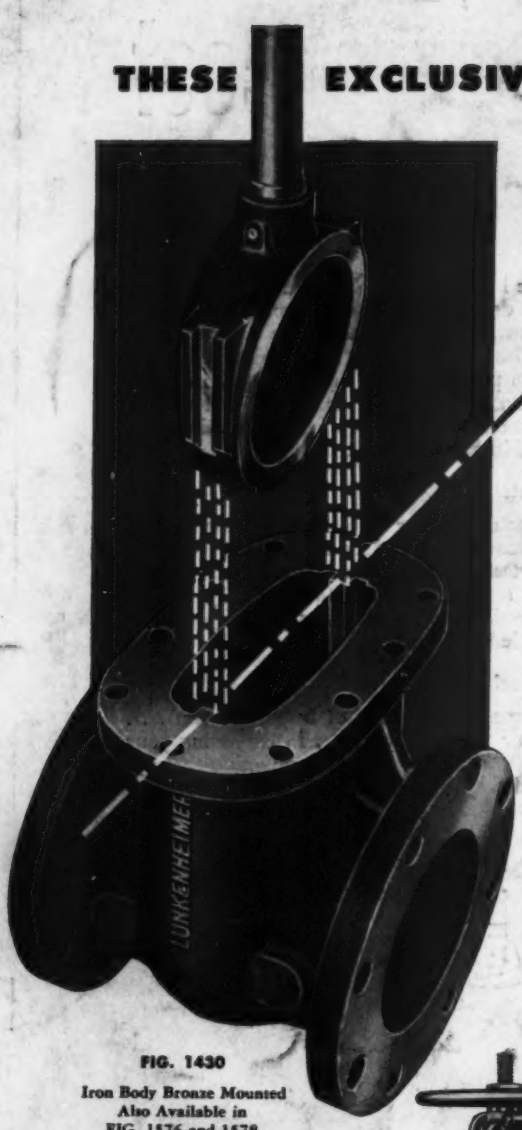

FIG. 1430
Iron Body Bronze Mounted
Also Available in
FIG. 1576 and 1578
All Iron
Screwed and Flanged Types
Fig. 1578N-4
3% Nickel Iron with
18-8 Mo (Type 316) Stainless Steel Trim

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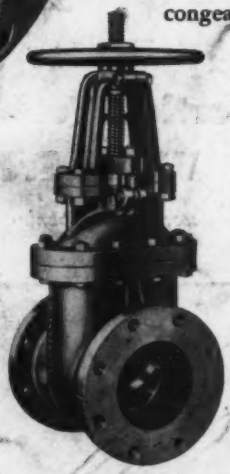

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